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February 19-21, 2014
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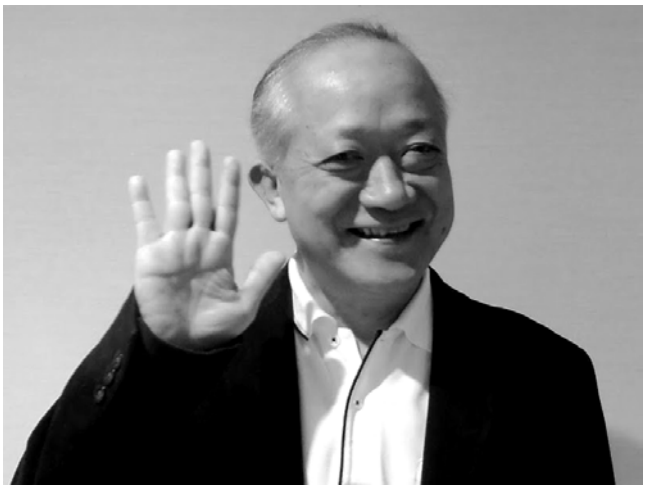
Welcome to GISUP 2014,For the future !!



Dear colleagues and friends from Asia !

We are so glad that we can meet again and again at Nagasaki. As you can see, Nagasaki is one and only city where had been opened its door for importing western culture in the period of national isolation in Japan. From this historical site Nagasaki, we planned to think about the globalized and informative generation and science for the future through international workshop.

If you visit to the historical site "Dejima and Glover-garden" in Nagasaki, you can easily understand how wonderful the multicultural and international exchanges are !! In Peace Park, you can pray for our peaceful future.

Everybody, let's pray, talk and spend goods time at Nagasaki with Asian friends. I believe that our collaboration and cooperation will lead us to fruitful future.

General Chair, Prof. Takakazu Ishimatsu

Takakazu Ishimatsu

ORGANIZING COMMITTEE

GISUP2014 Detailed Program

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Geospatial Information Science and Urban Planning
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Sponsored by Faculty of Engineering, Nagasaki University
Faculty of Environmental Studies, Nagasaki University
Faculty of Education, Nagasaki University
School of Health Sciences, Nagasaki University

Schedule

February 19, 2014 Registration and Keynote Lecture, Pompe van Meerdervoort Hall
February 20, 2014 GISUP2014, Oral Presentation, Ryojun Matsumoto Auditorium
Session-1, 2, 3, 4, 5 (9:00-18:55)
February 21, 2014 Technical tour in Nagasaki city (Individual Plan)

Registration Fee

General: 6,000 Yen
Student: 3,000 Yen

Conference Program Contents

The conference consists of information symposium for Geospatial Information Science and Urban Planning (GISUP2014), for scientific sessions on various GIS and urban planning method and system.

Coffee Break (10:55 - 11:10)

pages

Coffee Break (15:30 - 15:45)

Session-4 (15:45 – 17:15)

(Session Chair: Assoc. Prof Kazuichi SUGIYAMA, Nagasaki University, Japan)

Coffee Break (17:15 - 17:30)

Session-5 (17:30 – 18:45)

(Session Chair: Assoc. Prof Rieko NAKAO, Nagasaki University, Japan)

Closing Address (18:45 – 18:55)

Vice Chairman: Prof. In-Tae YANG (Kangwon National University, Korea)

[Keynote Lecture]
GISUP2014(International),No.16,pp.1-2, February 19-21, 2014

GISUP 2014, International, Nagasaki University
16th International Symposium of Geospatial Information Science and Urban Planning

Marine Space and Human Society

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Human society viewed marine space as empty, deep and useless mass of water for most of its recorded past. Geographical representations in ancient maps tend to center on land surfaces expanding their size, whereas marine surfaces are minimized and get little attention. Religions such as Hinduism or Buddhism, and even Catholicism and Judaism are generally averse to seas, and they discourage commoners from even approaching them. Exclusion of sea from daily life was in East Asia manifested by the policies of *Kaikin* or *Sakoku*, which banned maritime trade and overseas exchanges in the early-modern period. In the words of Kosaka Masataka, Japan was an "island country" and not a "maritime nation" for most parts of its history. Japanese long-term isolation from the outside world might appear as an extreme case in the Age of Discovery. But after the opening and reforms of Meiji, general importance of oceans in daily life declined and not increased. This time the decline was attributed to the establishment of institutions of modern state and economy, and advancement of industrialization and urbanization, and thus, it was a general phenomenon in the world.

With the arrival of modern nation state, the way humankind perceived progress tended to dissociate itself from ocean areas even further. Countries emphasized reclamation of internal land areas for reasons of security, expediency as well as national integration. (1) Settlement in interior areas intensified as they provided secure and stable base for business and life. In some cases, even capital cities were removed from insecure coastal areas into the safety of country's heartlands, as evidenced by Moscow, Washington D.C., or Ankara. (2) With technological revolution, new mineral resources were discovered and they increased the value of arid hinterlands. (3) Urbanization and raising concentration of population propelled construction of railway and road networks, and paved the way to accumulation of capital furthering industrial growth. Fishery, shipping and shipbuilding industries thrived during early modernization, but even such

industries shifted their weight towards land operations and mechanization (in food processing and land transportation), and significant numbers of population associated with them dwindled as a result.

History of oceans could not be more distant from such developments. While on land, fierce battles were fought over small tracts of land, on seas, freedom ruled the day. Only narrow belts of waters adjacent to coastal states were designated as territorial waters, and huge ocean areas called "High Seas" guaranteed freedom of navigation for any vessel. The reasons for territorial delimitation of nations-states, and against territorial delimitation in the High Seas laid in: (1) the introduction of modern International Law based on the liberal tradition of Hugo Grotius, (2) limits posed to security control and enforcement in High Seas, and (3) imperialistic ambitions that focused on acquisition of islands or land areas, and considered marine areas as "distances" and not as objects of colonial control. Territorialization of the modern nation-state without the same effect in marine areas has been referred to in literature as the Westphalian order.

Despite this historical trend, the last few decades have witnessed a reverse move. Nowadays, increasingly more attention has been paid to marine space in the fields of governance, growth, and diversity.

On the international level, (1) the new regime of UNCLOS introduces new concepts, such as Exclusive Economic Zone or Continental Shelf, both of which almost imitate territorial enclosure on land. (2) New regulations on shipping security and safety have started to favor coastal states rather than flag states, and (3) rising focus on biodiversity of marine life has put stricter requirements for proper management of marine resources.

These changes have been also accompanied on the domestic level with: (1) political restructuring and introduction of new legislative measures related to marine and coastal areas, (2) discovery of new technologies for exploitation of energy and mineral resources, and (3) pursuit of more environment-minded diversity, through establishment of marine eco-parks, natural world heritage sites and increase in marine eco-tourism.

In conclusion, human society tended to develop almost independent of oceans, which were considered distant, deep and irrelevant. But today, this long tradition of discarding oceans is over. New potential offered by marine space is a new frontier for human society, which may lead to entirely new ways of approaching economic development. They pose also new challenges, and international society will have to devise more effective ways to address negative effects of the promising "Blue Growth."

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Long-term Monitoring of Mangroves Conversion Along the Nothern Coast of West Java Province, Indonesia Using Multi-temporal Landsat satellite images

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ABSTRACT: In this study, we monitor the land use conversion of mangroves to the fish pound or in Indonesian call "Tambak" along four districts situated in the north coast of West Java Province every 2 decades using multi-temporal Landsat Satellite images. A total of 17,028 ha mangroves areas in those districs recorded in 1972/73 that drastically decreased to 9,063 ha in 1993/94 and then drop to 6.003 ha in 2012/13. Mangroves were heavily converted to tambak between 1972/73 and 1993/94 with decreasing rate of 398 ha/year, but rather slower as 153 ha/year between 1993/94 to 2012/13. In the same periods, the tambak areas increased from 17,064 ha to 27.721 ha and to 42.610 ha, respectively, with the increasing rate of 533 ha/year (1972/73 - 1993/94) and 775/ha/year (1993/94-2012/13). The loss of the dense mangrove cause severe beach erosion in all districts with rate of 1-10 km/year and the intursion of seawater up to 17 km. Beach erosion damaged many tambaks and houses of the coastal comunities. Efforts to restore the damaged mangrove have been made by various parties. A small fraction of the effort is successful, but most of the others failed, because of the improper in replanting mangroves.

1. INTRODUCTION

Indonesia is the largest archipelago country in the world with the second longest coast lines after Canada (81,000 km) and have more than 17,000 big and small Islands. Therefore, the cosatal zones are very huge. Situated in tropical areas, the coastal zone of Indonesia generally has 3 important ecosystems, namely mangrove, seagrass and coral reef. These ecosystems serve as shelter, spawning, nursery and feeding grounds for many marine faunas, including protected faunas such as turtles and dugongs **[1]**.

Indonesia also has the world's largest mangrove, ie 27% of the world's total mangrove, or 75% of the mangroves in Southeast Asia **[2]**. The Geospatisal Information Agency of Indonesia estimated a total area of 3.244 million ha based on 199 satellite images of Landsat-7 ETM+ **[3]**. The Biodiversity of mangroves in Indonesia are very varies. There are 75 species representing 24 family and 41 genera are found **[2]**. Other records at least 202 species that consists of 43 species true mangrove and the rest are associated mangrove **[4]**, while update data mention that there are 92 species of true mangrove **[5]**.

Ecosystem of mangrove, as well as seagrass and coral reefs are also known to have high productivity, exceeded the productivity of tropical rain forests **[6]**. Therefore, it is not be surprised that those ecosystems can make the coastal zones of Indonesia are very rich in marine resources. This leads Indonesia to become known as "mega marine biodiversity center in the world".

Economic valuation of mangrove ecosystems based on the benefits and functions such as production, ecological, and socio-economic functions show that mangroves provide high economic benefits to coastal communities. The average total economic value of mangrove ecosystems from various regions in Indonesia is about USD 3,750/ha/year [7, 8]. Nevertheless, the mangrove areas have been decreased drastically; due to high population pressure that causes the increase of many activities, such as deforestation and mangrove conversions to other land uses (reclamation for agiculture, industry, urban areas), as well as environmental pollution [9].

In a large-scale, mangrove area has been converted into brackish water fish ponds (in Indonesian called "Tambak"). The loss due to this conversion is estimated at 1.6 million ha. Conversion of mangrove areas in 1980s was 155,081 ha, mostly taking place in Java, Sumatra and Sulawesi and increased to 285,500 ha in the 1990s [2]. Actually, tambak has a long history in the northern coast of Java, where initialy milkfish (*Chanos Chanos*) has been cultivated since 15th century. However, in 1970 method of intensive shrimp farming in tambak was found, which coincided with high market demand and high prices of shrimp at that time caused large conversion of mangroves[9].

Changes in the function of mangrove to tambak have major impact on the eco-bio-physical processes, such as rapid erosion, loss of green belts, which serves as a natural buffer to protect the soil from large waves, water quality degradation, reduced marine biodiversity, loss of spawning, nursery and foraging habitats for fish, shrimp and other marine life. In this paper, we conducted study on the conversion of mangroves into fishponds (tambak) and its impact as well as conservation efforts along the northern coast of West Java Province.

2. Methods

This study was conducted along the northern coast of West Java Provinve. There are 16 districts and 7 municipals in this provinve. Among of them 4 districts are situated along the northern coast of West Java Province, namely: 1. Karawang, 2. Subang, 3. Indramayu and 4. Cirebon Districts that faced to Java Sea (Figure 1).

To map and to monitor mangroves and their changes due to conversion of mangrove into fish pond (tambak), we used effective and efficient methods by using remote sensing techniques utilizing multi-temporal Landsat images. Two-decadal (1972/73, 1993/1994 and 2012/2013) of 8 Landsat satellites images are used (Tablel-1).

Before the images analysis is done, first, all images were corrected for the atmospheric influences using a simple method known as Dark Object Subtraction (DOS) [10]. Map of habitats in 5 districts of study sites were made using cluster analysis module in the

Figure1. Map of study sites that conducted in 4 districts (Bekasi, Karawang, Subang, Indramatu and Cirebon) along the northern cost of West Java Province.

image processing packages (IDRISI ANDES soft-ware). Cluster analysis classified the study sites into 9 classes habitat (Sea, Mangrove-1, Mangrove-2, Tambak-1, Tamabak-2, Vegetation-1, Vegetation-2, Vegetation-3, Urban areas). After careful validation using field observation in 4 districts, the habitat were regroup again into 4 classes, namely Sea, Mangrove, Tambak and others (all other vegetation than mangrove + urban areas). Based on these maps the dynamics of mangroves and tambak can be observed, while the areas of both can be calculated.

Tablel-1. Two decadal of multi-temporal various Landsat satellite images use in this study.

Satellites	Path/Row	Date	Observed Districts			
			Kerawang	Subang	Indramayu	Cirebon
1. Landsat-1 MSS	131 /064	Oct. 1972	+	-	-	-
2. Landsat-1 MSS	130 / 064	Nov. 1972	-	+	+	-
3. Landsat-1 MSS	129 / 065	Aug. 1972	-	-	-	+
4. Landsat-5 TM	122 / 064	Dec. 1993	+	+	+	-
5. Landsat-5 TM	121 / 065	Aug, 1994	-	-	-	+
6. Landsat-8 OLI	122 / 064	Aug. 2013	+	+	-	-
7. Landsat-8 OLI	122 / 064	Sep. 2013	-	-	+	-
8. Landsat-8 OLI	121 / 065	Sep. 2013	-	-	-	+

3. Results and Discussions

Mangrove, as already mentioned provide products and environment services that are beneficial to the coastal communities. Large-scale mangrove conversion into tambak is the major causes of mangrove destruction along the northern coast of Java Island including the study sites that can be seen as follow:

Karawang Districts

This district consists of 30 sub-districts (kecamatan), 9 are located in coastal areas, but the observations only made in one sub-districts (Cimalaya District), in 4 vilages (Cemara jaya, Sungai Buntu and Sedari Villages) with the total cost line of 73.7 km. In general, mangrove has no longer formed forest, but only a few stands of trees that are grown in the dike, in the middle of the pond, in the left / right side of the river or the road and dry land (Figure-2) There were 14 species of true mangroves and 15 species of associated mangroves with *Rhizopora murconata, R. stylosa*, *Soneratia caeseolaris* dan *Avicennia officinalis* as dominant species.

Figure 2. Mangrove stands that no longer formed forest in some places of Karawang districts

Multi-temporal analysis of Landsat satellite images show a fairly dense mangroves found in 1972 (2,699 ha), but decreased in 1993 (1,159 ha) and dramatically decreased in 2013 (234 ha) (Figure 3). Conversion of mangroves to agricultural areas and fish pond (tambak) degraded the mangroves. This can be seen by the increase of tambak areas from 9,625 ha (1972) to 10,089 ha (1993) and became

wider to 11,411 ha (2013) (Figure 3). Degradation of mangrove caused coastal erosion that damaging many tambaks and residents (Figure. 4). The rate of erosion along the shoreline of this district reaches about 5 to 10 meters per year. As a result, sea water eroded the land to reach about 50-500 m.

Replanting hundred thousands of mangroves as an effort to rehabilitate mangroves have often attempted by many organizations, but some of them failed, because they used incorrect method or procedures, such as to plant a certain species of mangrove in the wrong habitat (substrate), some other just only plant the mangrove and left them without a properly maintained and monitor [11].

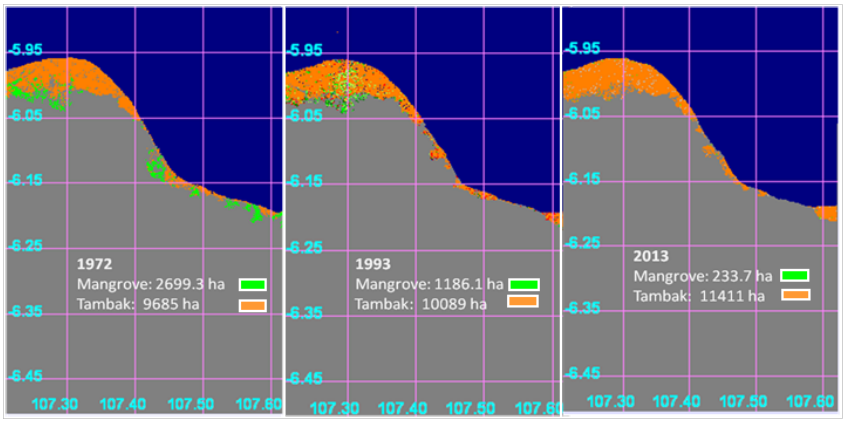


Figure 3. Long-term monitoring of mangrove and tambak dynamics using Landsat images in the Karawang District,

Subang Districts

This district cosisted of 30 sub-districts, and 4 among them are situated in coastal zone with the coastal line of 68 km. Field observation was conducted in sub-district of Blanakan in 3 villages. There are 10 species of true mangroves and 9 of associated mangroves. The dominant species for tree category is *Sonneratia caseolaris*, while for seed are *R. mucronata* and *A. marina*. High number of those seeds indicated that the study site could be served as a source of mangrove seeds.

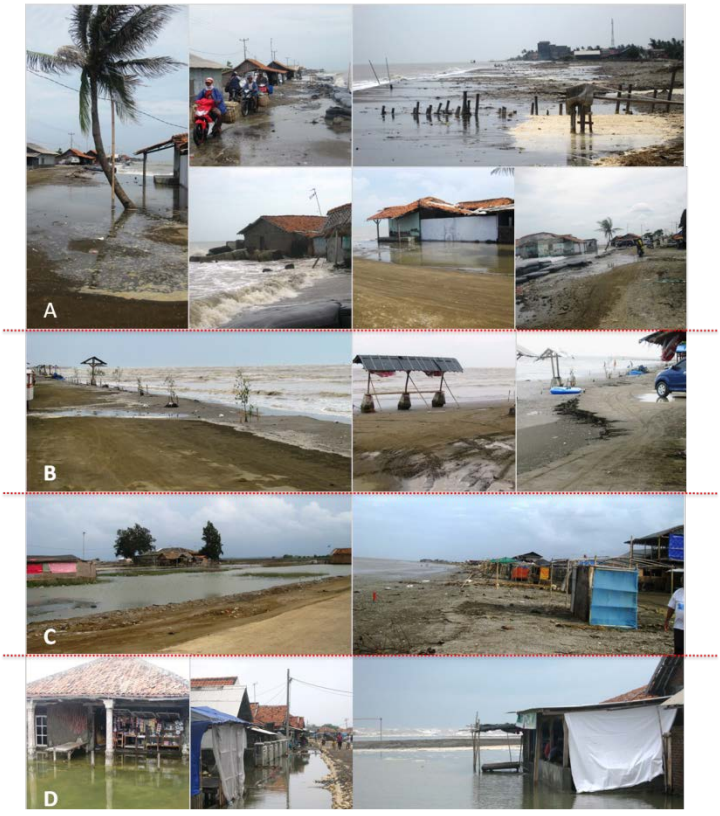


Figure 4. Coastal erosion in the some villages (A. Cemara Jaya, B. Samudra Jaya, C. Ciparage, D. Sedari) of Karawang District.

Multi-temporal analysis of Landsat satellite imageries showed relatively dense mangrove found in 1972 (3,100 ha). In 1993, the areas of mangrove increased (4,455 ha), but decreased in 2013 (3,873 ha) (Fig. 5). However, the areas were still bigger than those in 1972. Increase of mangrove areas in this districts demonstrated a success effort in mangrove replanting program both in the green belt areas, as well as in the tambak (Silva fishery

program), which was fostered by local Forestry Management Authority (Perum Perhutani). Such kind of conservation efforts need to be continued and spread to other districts.

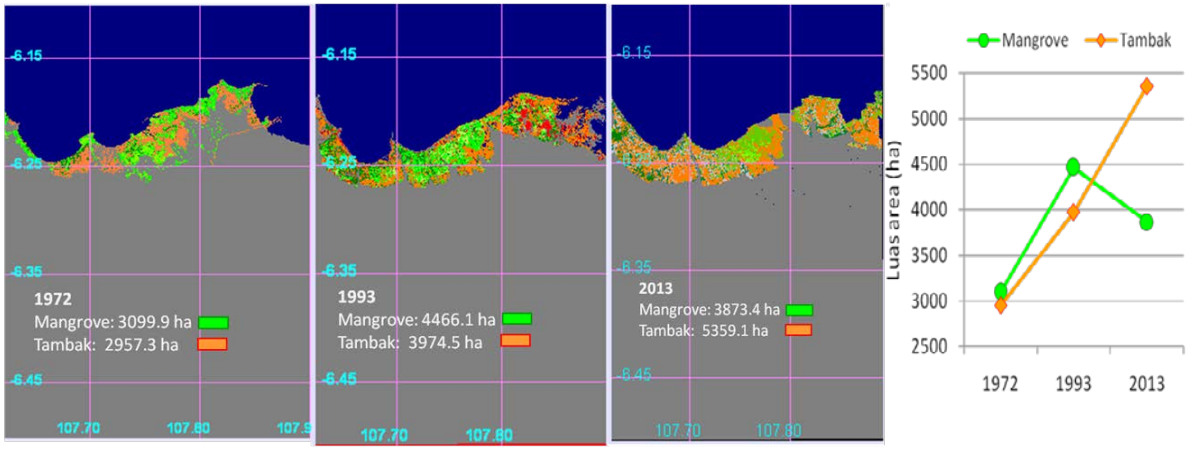


Figure 5. Long-term monitoring of mangrove and tambak dynamics using Landsat images in the Subang District,

At the same monitoring period, the areas of tambak increased from 2,957 ha to 3,875 ha and again to 5,359 ha (Figure 5). Although the areas of tambak in Subang were ½ of those in the Karawang, but the average of decline rate was similiar (69 ha/year). In this district, the coastal erosion relatively less then the other districts (karawang, Indramayu and Cirebon), because dense mangrove still grow in the coast line (figure 6). Thus, mangrove serves as a natural fortress that protects the coast from big waves, especially during west monsoon. Futhermore, fishermen in this sub-district, which are mostly focused on catching blue crabs (*Portunus pelagicus*) got the advantage of better catches due to mangrove services (Figure 7).

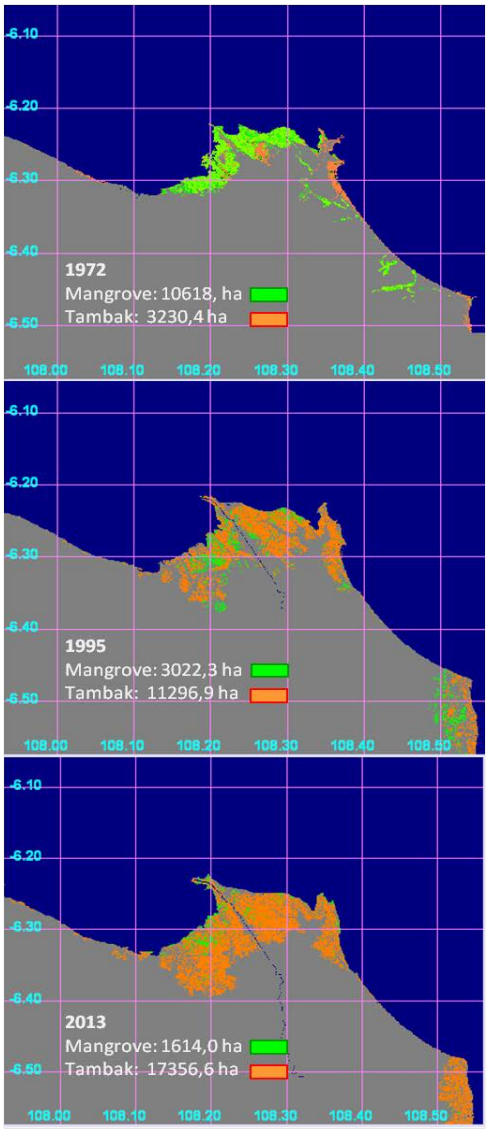
Figure 6. .Mangrove in the coast line of Subang District act as natrural fortress in protecting the beach from erosion (Top).

Figure 7. Crab fishermen got adventages of better catches due to mangrove services (Left).

Indramayu District

The district of Indramayu has 31 sub-districts among them, 11 sub-districts are in the coastal zone with the coast line length of 141.1 km. Observation conducted only in Sub-district of Kandanghaur (Eretan Wetan and Kulon villages). There were 14 species of true mangrove and 6 species of associated mangrove with the dominant species of *R. mucronata, R. stylosa* and *A. marina*. Mangrove distribution is very limited around the tambak and the river edge (Figure 9)

Figure 9. Distribution of limited mangorve in Indramayu District.



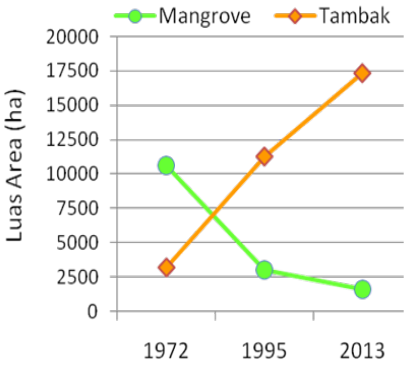


Figure 10. Long-term monitoring of mangrove and tambak dynamics using Landsat images in the Indramayu District,

Multi-temporal analysis of Landsat satellite imageries showed that initially, mangroves in this district were very dense, ie 10,618 ha (1972), but dropped dramatically to 3,222 ha (1995) and recently only 1,614 ha (2013) (Figure 10). The average of declining rate of mangrove was approximately 345 ha/year due to mangroves conversion to tambak. On the contary, a very sharp increase of tambak were shown from 3,230 ha (1972) to 11,297 ha (1995) and recently increased to 17,357 ha with a rate of 337 ha/year (Figure 10).

The impact of the damage mangroves along the coast of this district has resulted very broad erosion, and damaging many coastal structures (Figure 11). Coastal erosion occurs in many places within this district reaching 1-10 m/year and seawater intursion up to 17 km. To solve erosion problems, coastal structures such as dikes, sea wall, groyne or breaker waves are required, but this needs high costs as shown in Figure 12).

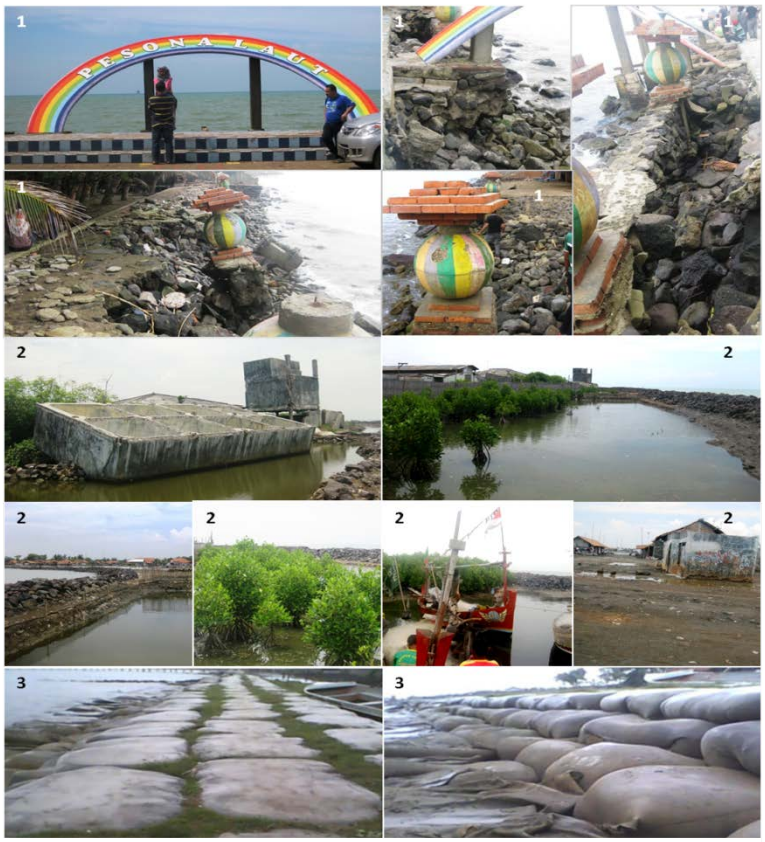


Figure 11. Coastal erosion in the some places of Indramayu District.

However, based on Fig. 10, the decreasing rate of mangrove significantly reduced in the period 1995-2013 compared to the period 1972-1995. These are due to:

- The Launch of mangrove rehabilitation movement by the Office of Forestry, Indramayu District since 2004 with a plan to plant 1.4 million mangrove trees in areas that mangrove condition was critical. Effort of coastal reforestation will continue until the damage condition of mangrove recovery.
- Increase in public awareness of the local communities about the importance of the role, functions and benefits of mangrove, so many communities begin to participate on mangrove planting and rehabilitation activities, although the participation is still low.
- There are many private companies, NGOs, universities, and other professional organizations also participated in mangrove conservation, such as the Indonesian oil company (PT PHE ONWJ) which is great help in mangrove rehabilitation/ reforestation through their 'Corporate Social Responsibility or CSR" program, not only in this district, but also in 3 other districts, Karawang, Subang and Cirebon.

Although mangrove reforestation efforts have been made in almost all the northern coast of Java Island (western, central and eastern provinces), including the study sites, but most of the effort is wasted because many planted mangroves do not grow well and eventually died, as a result most of the planting is done on beaches that are eroded and in habitats that are not suitable for mangrove to grow and develop, such as in the temporary silt areas, sandy soil, and paddy fields. In this district a small successes have been shown in the Eretan Wetan Village of this districts (Figure 13)

Figure 12. Dozen km of high cost sea wall for protecting the beach in Indramayu District.

Figure 13. A small success in replanting mangrove (*Rhizopora* sp.) at Eretan Kulon Village,

To replant mangroves in the area that has been damaged it is need to consider several things. The most important thing is to know the history of the selected sites whether or not the species of mangrove ever grow there. Of the approximately 60 species of mangrove trees and shrubs, as well as some 20 species of associated mangroves, only 12 species are commonly used for restoration, ie Rhizophora, Avicennia, Sonneratia, Bruguiera, Heritiera, Lumnitzera, Ceriops, Excoecaria, Xylocarpus, Nypa, Cassurina, and Hibiscus. Determination of selected species also depends on soil texture, salinity, and long inundation, as well as other micro-climate **9, 11, 12].**

Cirebon District

The Distrcit of Cirebon consists of 40 subdistricts, in which 5 of then are coastal sub-districts. Field observation was conducted in the subdistrict of Kapetakan precisely in the Bunko Lor Village. The mangrove diversity is very poor, there are only 2 species of true mangroves and 2 species of

Figure 14. Very poor buidiversity of mangrove that grow at the edge of river (Left). Most of the mangrove has already converted to tambak (right).

associated mangrove**.** Most of mangrove has converted to tambak, so it does not seem to have grown in the embankment of tambak as in other districts (Figure 14).

Multi-temporal analysis of Landsat satellite imageries showed that mangrove areas in this sub-district showed a decreasing from 611.4 ha (1973) to 227.3 ha (1994), but slightly increased to 281.7 ha (2013). (Figure 15). Increase of mangrove areas is due to the efforts of many parties in

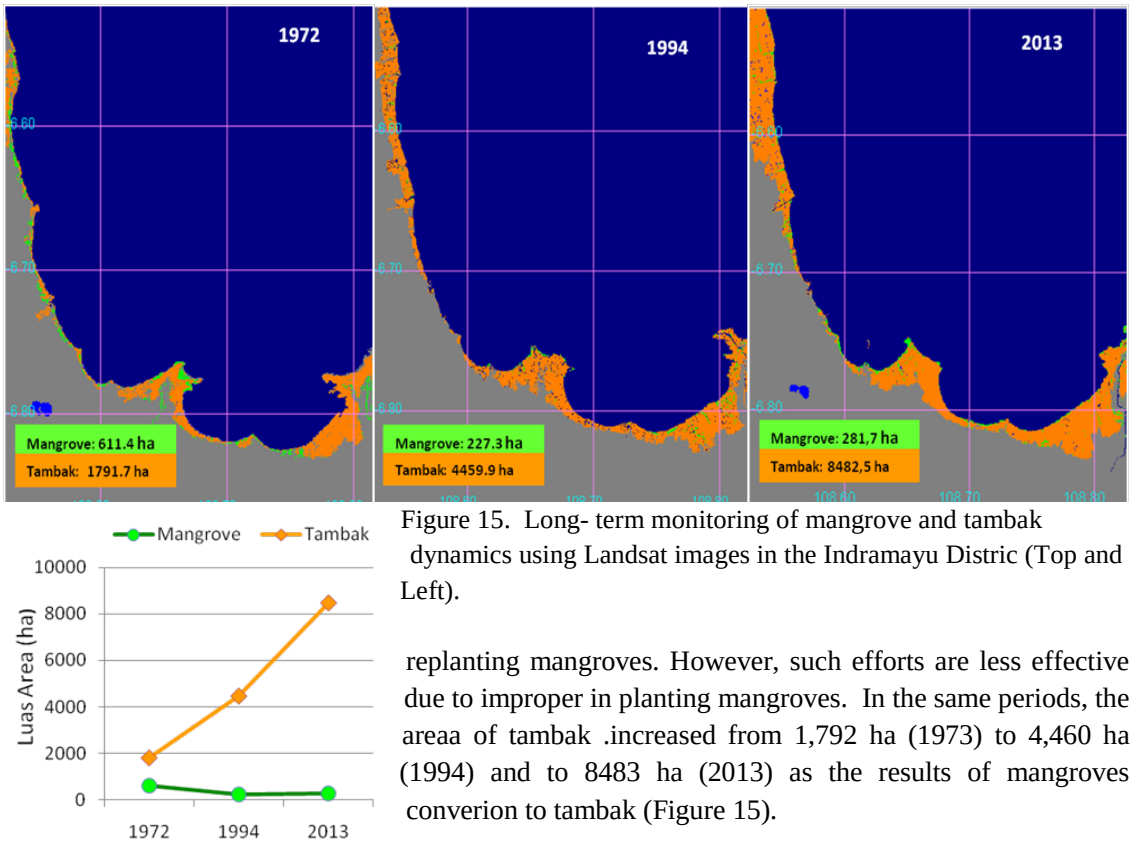


Figure 15. Long- term monitoring of mangrove and tambak dynamics using Landsat images in the Indramayu Distric (Top and Left).

replanting mangroves. However, such efforts are less effective due to improper in planting mangroves. In the same periods, the areaa of tambak .increased from 1,792 ha (1973) to 4,460 ha (1994) and to 8483 ha (2013) as the results of mangroves converion to tambak (Figure 15).

Erosion along the coast of Cirebon District due to reduced mangrove vegetation is now threatening the costal communities, while mangroves that are able to withstand the big waves have not been planted. It is estimated 3,000 hectares of coastal land has been eroded by the waves. Thus, If there is no effort in planting mangroves, the coastal erosian will be intensified, and damaging all sub district that located in the coastal zones.

Concluding Remarks

Study on land use conversion from mangrove ecosysrtems to tambak have been conducted in 4 districts along the northern cost of West Jawa Province. Mangrove ecosystems provide environmental services as well as goods, such as marine products to the comunities that live in Coastal areas, However, mangrove in all observed districts have been converted to tambak, some even dtrasticaly such as in Karawang District without considering the negative impacts as heavy erosion in the coastal line that destroyed the tambak themselves, community resident (housings), threatened the coastal structures such as streets, bridges, buidings, and seawater intursion, etc.

The main reasons of mangroves convesion is that the profit gained from fish and shrimp cultured in tambaks as shown in Table 2. However, those profits can only be perceived in just a short

time, when the tambaks are still in good condition, otherwise would be a disaster if the function of mangrove lost. Mangrove valuation study that we've done showed that let the mangove as it will provide longer benefits [8]. Once a mangrove ecosystem is damaged, then it is very difficult to recovery, it will consume times and require high cost.

Therefore, mangrove restoration should be done immediately. Great efforts have been widely shown; hundreds of thousands of mangrove trees have been planted by the various parties, but fail because it was done in the wrong procedures. Selection of mangrove species that appropriate to the location (habitat) that will be planted as well as considering the life requirements of each species of mangrove is a prerequisite in order to obtain the success, and thus, great efforts are not in vain.

Table2. Fish and shrimp production and values from tambak in each districts in 2011[13].

Fish & Shrimp Production and Values	Districts			
	Karawang	Subang	Indramatu	Cirebon
Production (tons)	35,459	1,361	101,455	15,821
Values (in million USD)	46.77	1.54	168.72	29.74

Acknowledgements

This paper is a part of study on the coastal biodiversity in the northern coast of West Java, which is funded by the national oil company PT PHE ONWJ, as aCorporate Social Responsibility (CSR) program of that company. We would deeply like to thanks for the permission in writing this paper and for a partial funding support.

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A Case Study of Spatiotemporal Evaluation of Thermal Environment in Kumamoto City Urban Districts

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ABSTRACT: Moving meteorological observations to investigate the thermal environment were held in Kumamoto City urban districts in 2013. In this paper, the result of August 8 was used to evaluate the spatiotemporal characteristics of the districts. At each observation, two instrument were used and the results' error caused by differences of observation time and instruments were calibrated. Then, the results were able to show the thermal environment of the districts, with the allowable margin of error. Besides, some peculiar areas were categorized into hot zone and cool zone for each measurement time, at nine, twelve, fifteen and eighteen. In conclusions, it was suggested that this investigation method was useful to evaluate the thermal environment of urban districts in time and space.

1. INTRODUCTION

In urban area, the thermal environment becomes worse in summer. It causes the increase of health disease such as heat exhaustion. This phenomena, moreover, causes the increase of energy consumption due to air conditioning for cooling buildings. If the effective countermeasures were taken and succeeded, it would save the energy consumption and reduce CO_2 emissions.

The authors had been investigated the thermal environment of Kumamoto City urban districts, and tried to assess the impacts of thermal environments and influences to the air conditioning loads. In previous study, two years observation results were compared, and the correlation was fairly good [1][2]. However, the analysis was limited mainly in three arcade streets because the main research objective was to evaluate the air conditioning cooling energy to connect with outdoor air temperature and building's structures. In this research, to improve the reliability of evaluation with tolerance, two instrument were used for each observation, and the error caused by differences of observation time and instruments were calibrated. Then, the spatiotemporal thermal environments of the urban districts of Kumamoto City were examined.

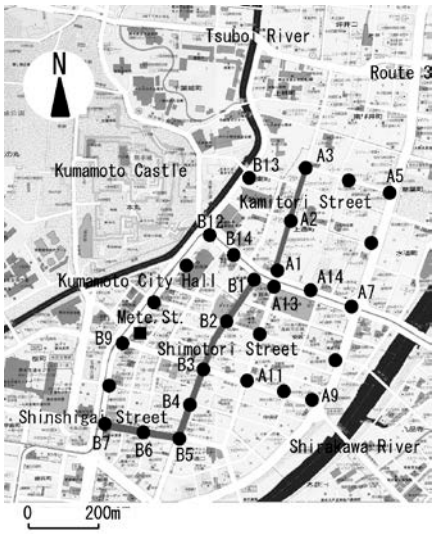
2. THERMAL ENVIRONMETAL OBSERVATION

(1) Methodology

The observations were performed about once in a month in 2013. The observation times were 9:00, 12:00, 15:00 and 18:00. The observation points were shown in Figure 1. The air temperatures, the relative humidity, the black globe temperatures and the WBGT, Wet Bulb Globe Temperature, were measured using portable measuring instruments (WBGT-113 by Kyoto Electronic Manufacturing Co., Ltd.,). The WBGT indicates the risks of heat diseases [3]. In this paper, the data of August 8 was used to evaluate the spatiotemporal characteristics of the districts.

(2) AMeDAS data

The AMeDAS air temperatures on July 17, 19 and August 8 in 2012, observation date, were shown in Figure 2. For these days, the maximum air temperatures were over 33.0˚C. On August 8, it was 12:00 that the air temperature becomes highest, 33.2˚C. While, the lowest air temperature was 27.2˚C at 5:00 and 6:00.



■: Meteorological meseament station.

Figure 1 Observation points in Kumamoto City urban districts. (Map: Fukuoka Jinbun, Co., Ltd., "Kumamoto Grand Machizu")

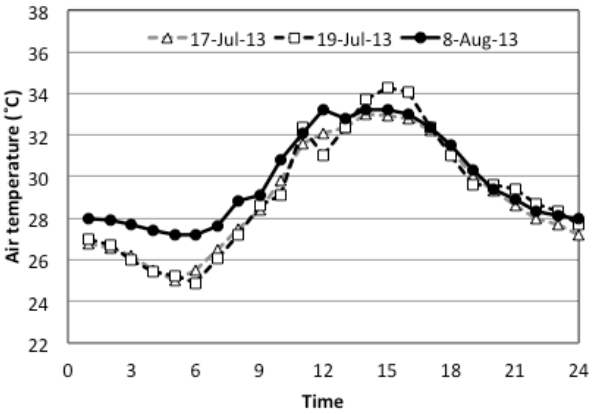


Figure 2 Air temperature at Kumamoto City observed by AMeDAS (July 17, July 19, August 8 in 2013) [4]

(3) WBGT and air temperature: Results of moving meteorological observations

Two observation courses were determined. The Course A, A1 to A14, was the east area and the Course B, B1 to B14, was the west area. The start point, A1, was set at "Bipuresu Hiroba (=square)", and the end point was same. The differences of measurement times were changed into precise times, 9:00, 12:00, 15:00 and 18:00. Each difference of value at observation point on a course at a time caused by moving was allotted proportionally according to passed time from start point to end point.

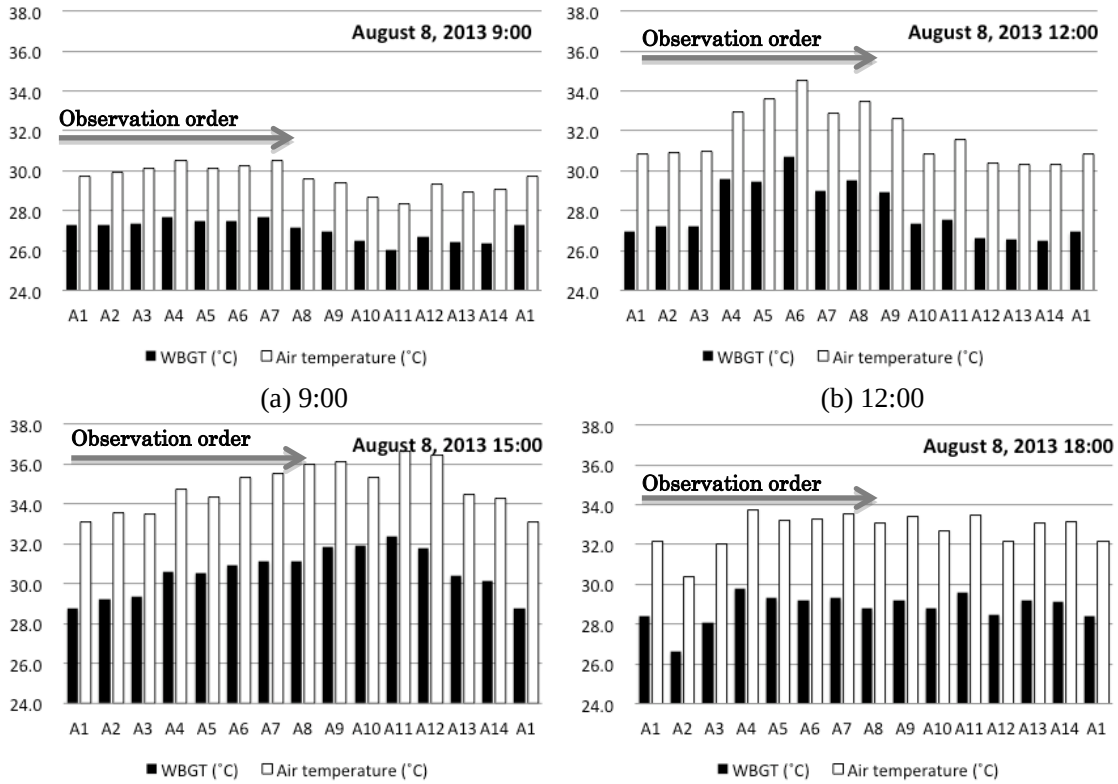
Figure 3 shows the result of Course A, using Instrument No.2. Figure 4 to Figure 6 shows the results of Course A, Instrument No.4, Course B, Instrument No.1, and Course B, Instrument No.3, respectively. All the instruments were adjusted to the No.3 instrument at 9:00.

In Figure 3 (a), at 9:00, the points in North zone, A1 to A7, and South zone, A8 to A14, were separated with 'Toricho-suji' street. The north zone was about 1.0˚C higher than the south zone. At 12:00, the points A4 to A9 increase temperature to 33.0˚C to over 34.0˚C. It was considered that the reason was the heat exhaustion from car traffics. At 12:00, the differences were about 3.0˚C or much more. At 18:00 the differences were decrease to about 1.0˚C to 1.5˚C. Figure 4 shows the results by other instrument, and the tendency was similar.

On the Course B, shown in Figure 5 and Figure 6, remarkable differences were found only at 12:00. Points B4, B5 and B14 were higher than other points and were about 35.0˚C.

(4) Zone categorize of WBGT and air temperature

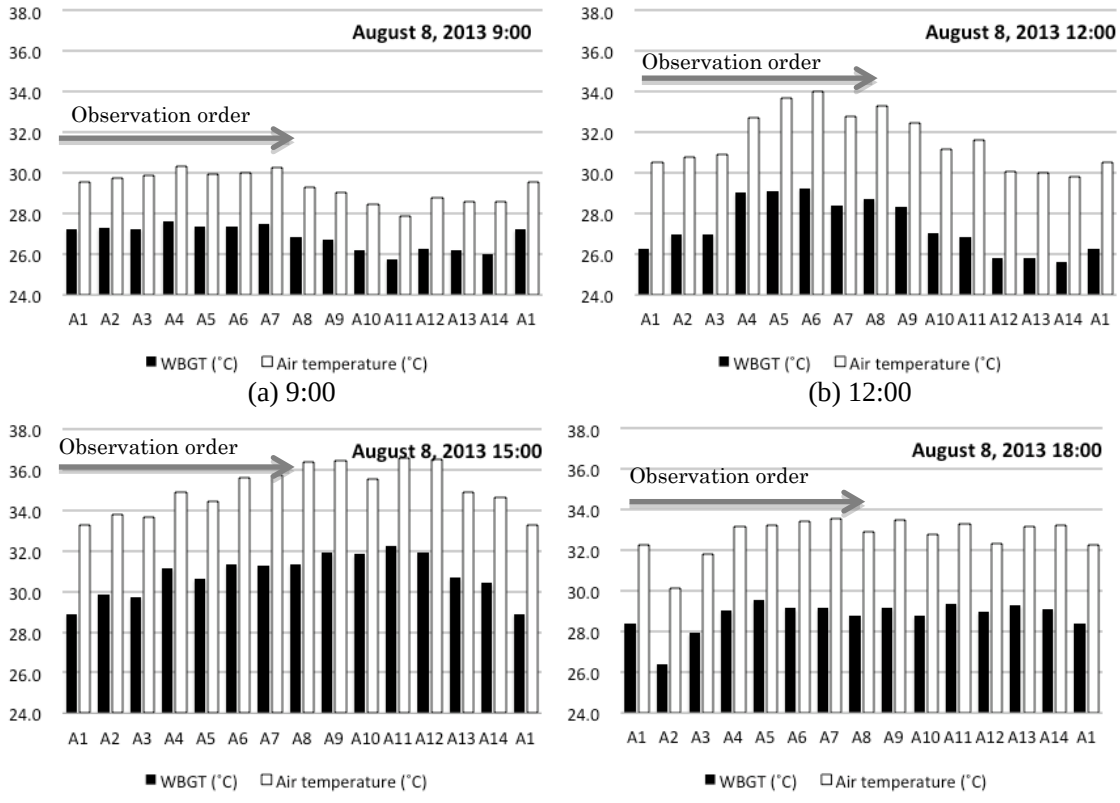
Figure 7 shows the categorized zone of WBGT and air temperature at each observation time. At 9:00, the relatively high temperature area of 30.0˚C was distributed around West and North zone. On the other hand, lower area about 28.5 to 29.0˚C was spread around East-South zone. At 12:00, high temperature areas about 33.0 to 34.0˚C were limited near National Highway 3, the center of 'Toricho-suji' street which is the main street of Kumamoto City center, B1 and B14, and South of 'Shimotori' arcade street, from B1 to B5. The relatively cool areas were distributed West and North zone and the center of 'Shimotori' arcade street. At 15:00, East zone was remarkably high temperature over 35.0˚C. This result should be caused by National Highway 3's traffics. West and North zone were over 33.0˚C, but relatively cool. At 18:00, cooling down at the zone along National Highway was slow, and the temperatures were 33.0˚C to 34.0˚C. Inside zone of the districts were relatively cool, and were almost 32.0˚C.



(a) 9:00 (b) 12:00

(c) 15:00 (d) 18:00

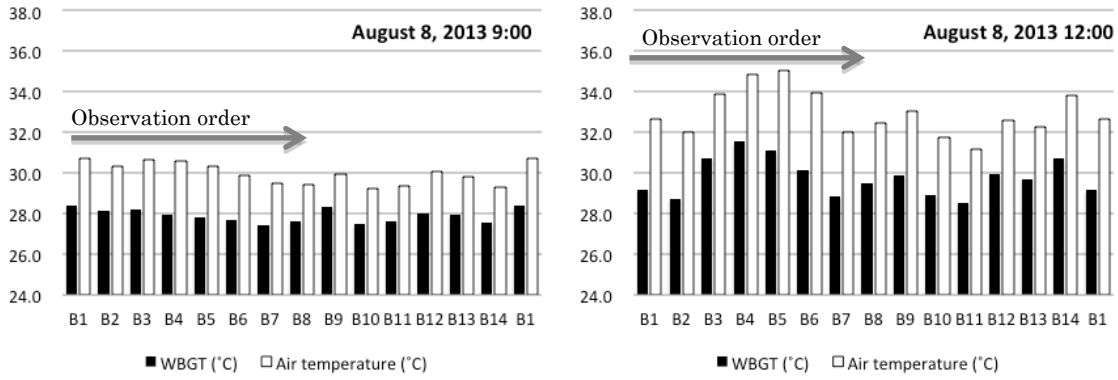
Figure 3 WBGT and air temperature at the research area (Course A, Instrument No.2).



(a) 9:00 (b) 12:00

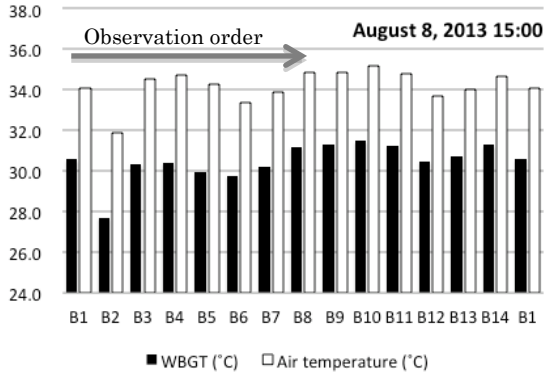
(c) 15:00 (d) 18:00

Figure 4 WBGT and air temperature at the research area (Course A, Instrument No.4).

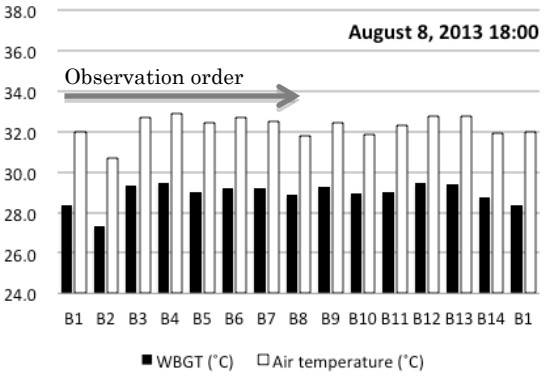


(a) 9:00

(b) 12:00

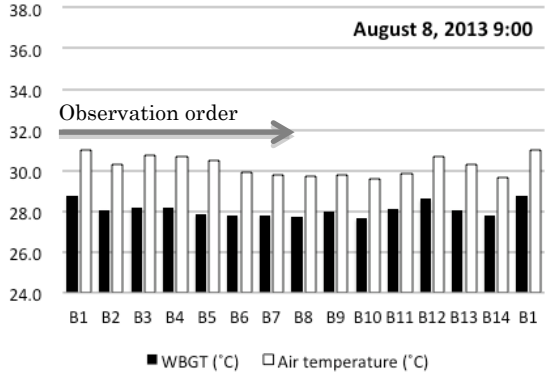


(c) 15:00

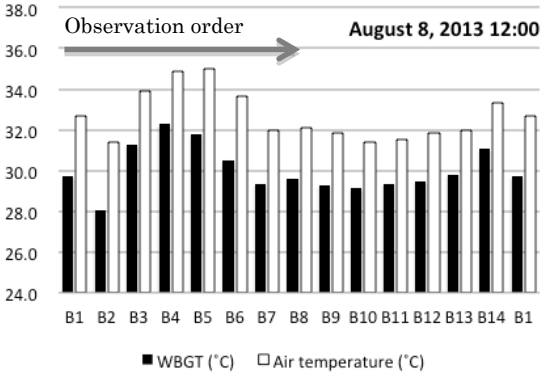


(d) 18:00

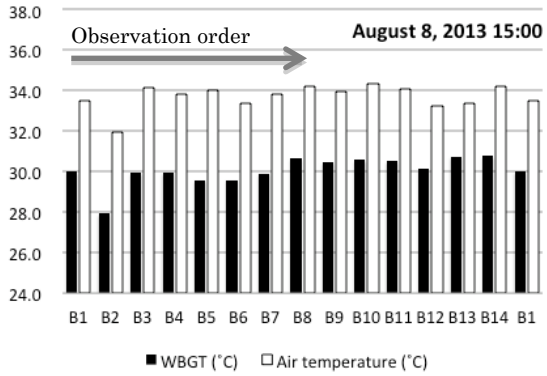
Figure 5 WBGT and air temperature at the research area (Course B, Instrument No.1).



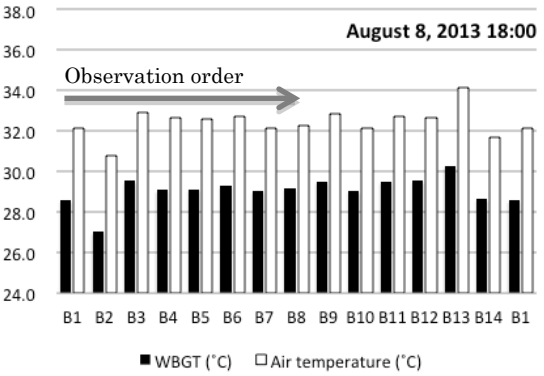
(a) 9:00



(b) 12:00



(c) 15:00



(d) 18:00

Figure 6 WBGT and air temperature at the research area (Course B, Instrument No.3).

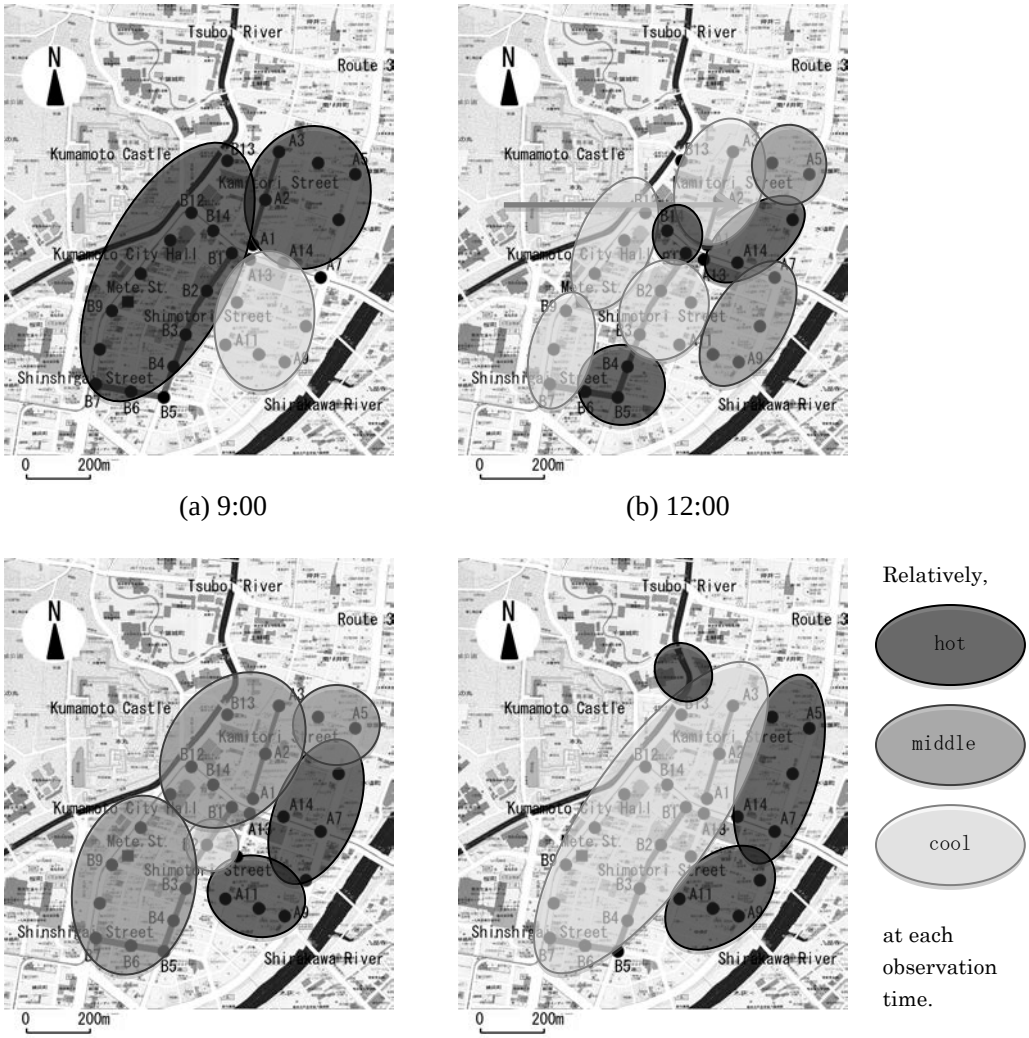


Figure 7 Categorized WBGT and air temperature zone (August 8, 2013)

3. DISCUSSIONS AND CONCLUSION

Moving observation is considered as an easy method but furnishing low reliability information. In this research, however, to use more than one instrument and calibrated the differences of observation time, the reliability of them were improved into allowable margin of error. So, the spatiotemporal thermal environments of the urban districts of Kumamoto City were examined and the zone-categorize were performed for each observation time.

This method presents effective information for assessment and discuss about the urban districts easily. It is also considered that this method should be useful to discuss the countermeasure, make urban planning and design. Moreover, considering in relation with air conditioning loads, the CO_2 emission due to urban thermal environment must be estimated easily and reliably.

The next subjects are to analyze the data through a year, and make sure the reliability of this moving observation method. And exam those issues, such as planning and design the cooling spot, calculating air conditioning load, and estimate CO_2 emission.

ACKNOWLEDGEMENT

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School Trips from Nagasaki to China in Prewar Years

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ABSTRACT: In recent year, since globalization, school trips abroad have grown popular. However, even before World War II school trips to Korea, Manchuria, and Eastern Asia were conducted by business high schools and prefectural junior high schools.

This study focuses on the school trips undertaken by Nagasaki high schools to China before World War II, and trace their history from the first trip to Shanghai conducted by Nagasaki Business High School (NBHS) in 1896, to the last Korea-Manchuria trips by Nagasaki Prefectural Junior High School's (NPJHS) in 1940. The main methods used in this study rely upon research into literature, and interviews to former students of NPJHS were main methods to reveal how the trips were conducted.

As a result, this study determines that Korea-Manchuria trips originated in the prevailing militarism to the young generation after the Russo-Japanese War, and that they became popular in Nagasaki because of its geographically advantageous location. However, school trips to Shanghai by NBHS started based upon students' requests because many people in Nagasaki were involved in trade with China. Even though the trips were carried out during the days of colonialism, they contributed to a further understanding of and interest in China among Nagasaki's young people.

1. INTRODUCTION

During the nineteenth century, German educators brought walking tours and educational trips to Japanese schools. Since then, school trips have developed as one of the most significant activities of a regular Japanese school curriculum.[1] As the world globalizes, more and more schools choose to take their students to foreign countries. However, even before World War II schools travelled to Korea, Manchuria, and Eastern Asia, although this was mainly a practice at business high schools.

This study focuses on the first school trip to Shanghai carried out by the Nagasaki Business High School (NBHS), as well as the last Korea-Manchuria school trip by the Nagasaki Prefectural Junior High School (NPJHS). The main methods used in this study to understand how the trips were conducted include the detailed analysis of a collection of students' memoirs about the trip, as well as interviews with four of the participants to the NPJHS trip.

[1] *Tourism Science Dictionary*, 46.

2. SCHOOL TRIPS FROM NAGASAKI TO CHINA DURING THE PREWAR YEARS

In this section, the origin of the first overseas school trip by the Nagasaki Business High School started clarified through a newspaper article, as well as and started and the end of the Korea-Manchuria School Trip by the Nagasaki Prefectural Junior High School clarified through a newspaper article, as well as the students' memoirs and an interview to the participants.

2.1 The first overseas school trips

Japanese school trips began in 1886 when the Tokyo Normal School initiated a long distance hike, which combined a form of marching travel for military training along with academic research. Afterwards this practice was promoted nationwide among the middle schools and the high schools of the old educational system.

In November of 1896, the next year of the Sino-Japanese War, the Nagasaki Business High School planned a trip to Shanghai, lasting nine days and eight nights. This trip is considered the first Japanese overseas school trip.

On July 21 of the same year, Japan concluded a treaty with Qing called the “Treaty of Commerce and Navigation,” in which Japan gained business rights in the manufacturing industry, as well as consular jurisdiction with conditions very favorable to Japan. Pleased and proud students in NBHS thus strongly urged the school to visit Shanghai, in order to learn about business and trade practices with China (Chen Zuen 2007). In response to this request, the school changed the destination of their school trip from Kyoto to Shanghai.

On the evening of November 1st, 1896, and accompanied by their two teachers, Wakasugi Yonetaro and Fukahori Toyotaro, twenty-five students in the fifth grade left Nagasaki harbor on the Nippon Mail Steamer, Kobemaru. This voyage lasted thirty-six hours, and the passengers disembarked at Shanghai dock in the afternoon of the third day.

According to the Chinzei Daily News on November 12th, 1896, this trip was reported as follows:

> At noon on November 3rd, the students of Nagasaki Business High School were allowed to look around the city of Shanghai when they landed. On the early morning of the 4th, the students started sight-seeing at the foreign settlements of Britain, the United States, and France. After that, they visited downtown for study and observation.
>
> On the 5th, when the Nippon Mail Steamer Company packed goods in its Shanghai branch, the students had the chance to learn relevant business regulations about transportation. They then visited Donghua Textile Institute near the Cotton Exchange, the Cotton Cloth Bureau, paper products manufacturing sites, and other locations along the Yangshupu harbor. About two in the afternoon they visited the Towa firm, where they were cordially welcomed. On the way back, they visited the Dadongxinli firm.
>
> On the morning of the 6th, the students visited the Zhengjin Bank and browsed old and new Chinese currencies. They then went to the Shanghai Branch of the Mitsui Company, after being kindly invited to inspect materials in each department and even in the warehouse. After that, they took six luxurious vessels each fit for four men, in order to sail to the Pudong residence on the opposite side of the foreign settlement, where they visit the Mitsui’s cotton factory. While there had been a labor dispute of the workers on the previous day, its resolution fortunately allowed operation to resume in time for the students’ visit.
>
> On the November 7th , from nine to eleven o’clock the students had leisure time to go shopping, and soon afterwards the ship departed from Shanghai at twelve o’clock. They stayed

at two Japanese inns, Kumamotoya and Houyoukan in the Hongkou district, where charges were reasonable. The Japanese Consulate, the Japanese Association as well as other institutions made efforts to provide the students with security, and ensure sufficient convenience for their travels. Overall, the expense for this school trip was only eleven yen and seventy-five sen for each teacher and student.

The twelfth alumni, who graduated in 1897, experienced this first Shanghai tour. One student, Shibuya Shinsaburo, who later became the founder of a Japanese whaling company, wrote about this trip in his memoires as follows:

> The first thing that came into sight was the modern, prosperous, and cosmopolitan city with famous skyscrapers and all kinds of people walking around. I was surprised to find even a bearded Indian among the police officers (Chen Zuen 2007).

> I couldn't sleep well on the previous night because I was too excited. In 1896, twenty-five people left Japan for Shanghai by the Nippon Mail Steamer Kobemaru. The voyage took thirty-six hours to arrive at Shanghai port. Shanghai was certainly an international and prosperous city, which we could see was full of unique and exotic treasures. We stayed in Shanghai for two or three days. During our stay, a Japanese hotel owner from Nagasaki invited us to visit, and we enjoyed delicious Chinese food in his restaurant. However, in China Town we were scared because Chinese people screamed at us, calling us "Oriental Devils." We were busy sightseeing and visiting a spinning factory, and we didn't have enough time to go to Suzhou or Hangzhou. We returned to Nagasaki by the same ship (Taniguchi 2009).

The students were fortunate to have the chance to see the international and exotic city of Shanghai, however, their contacts were limited to theJapanese people working there. The student's description of the scene where he heard Chinese people's angry voices was vivid, and this student memoir allows us to observe the Chinese people's feeling under colonization.

After what the Japanese schools views as the success of the first trip to Shanghai, the inclusion of internships became a regular school activity until 1927. From 1928, the school also added North Korea and Manchuria as two new school trip destinations, in addition to Shanghai. However, the school trips were abolished in 1940 due to the Second World War.

Shanghai made an indelible impression on Japanese students, and the trip inspired them as they sought to choose their career in life. In fact, many students who had participated in the Shanghai travel eventually chose to work and live in Shanghai after they finished their studies. In this sense, the trip greatly influenced the students and contributed to their futures.

According to Chen Zuen (2007), the presence of a majority of people from Nagasaki among the Japanese residents in Shanghai, contributed to the popularity of this destination for overseas school trips. In addition to the Nagasaki Business High School, on May 22, 1923, the Nagasaki Prefectural Omura Junior High School travelled to China, and *Shen Bao* published the news that they had visited the Shanghai Commercial Press[2]. In May of 1929, the Nagasaki Prefectural Isahaya Junior High school also organized a trip to Shanghai-Suzhou which lasted eight days and seven nights.

As *A Century History of Nagasaki Business High School* mentions, many graduates vividly remembered the pre-war school travel to China, which affirms its significance. Through these school trips, students obtained a good understanding of China at that time, and developed a favorable

2 One of the most influential and longest continuously published newspaper in the modern history of China.

impression of the country in general, and especially of Shanghai. Not only did the trip provide a chance to broaden students' horizon, points of view, and actions, as they learned knowledge about business practices, it also could open wider career paths for them. Plenty of students from the Nagasaki Business High School eventually returned to China and worked in Sino-Japanese trade. Furthermore, many graduates suggested that the school should begin to offer Chinese subjects and establish formal relationships with sister schools in Shanghai.

Mukayi Yasuo, a teacher at NBHS who also compiled *A Century History of Nagasaki Business High School* wrote:

> Recently, the students only focus on their hometown, Nagasaki, and they are afraid of going out of their county to have a look at the world outside. Before the war, we had school trips for students to have opportunities for understanding the world outside, so that many of their views changed. Therefore, nowadays, school trips abroad are highly recommended.

2.2 The Last Korea-Manchuria School Trip by the Nagasaki Prefectural Junior High School

In 1906, the year following the end of Russo-Japanese War, the Ministry of Education and the Department of the Army held a nationwide junior high school joint trip to Manchuria. This project pioneered Manchuria and Korea school trips. Selected applicants from the whole country visited from July 13 to August 12, 1906, and arrived via a boat prepared by the Department of the Army of Manchuria.

Junior high school students were divided into five squads, and went on a tour of the sites of Russo-Japanese War in Northeast China. Since that year, Shanghai and Manchuria became the main destinations for overseas school trips by the schools in the Kyushu area. However, in June1940, the practice of school trips to China and Manchuria came to an end because of the war. Therefore, the journey made by the Nagasaki Prefectural Junior High School in that year was the last pre-war student trip.

In addition to the interviews held with students who participated in the tour to Korea-Manchuria, we would like to introduce some essays, written by participants in Nagasaki Prefectural Junior High School's *Journal of Alumni Association*. The following pieces address how the trip was conducted.

> On April 23rd, 1940, about eighty fifth-grade students and three instructors departed from Nagasaki on a thirteen day journey to Moji, Shimonoseki, Busan, Jingcheng (now- Seoul), Pyongyang, Fengtian (now- Shenyang), Fushun, Xinjing (now- Changchun), Lushun, and Dalian.

At that time, students had been educated to believe that "Japan was the kingdom of the Emperor, God of the center, fighting for justice at home and abroad." As a result, they also eagerly supported their government's efforts to establish a Japanese country in Manchuria. Although the original purpose of the school trips was to provide international experiences for the students, participants were nonetheless more excited to go to see Manchuria s developed by Japan rather than traveling abroad to other, less-familiar locations in China. The following are the details of the travel, as revealed in essays and interviews:

The train traveled from Pyongyang through the Yalu River into Manchurian territory. The students, brought up in Nagasaki and surround by mountains, were deeply affected when they saw the vast

plains of Manchuria. They were also impressed by Fengtian hotel's flushing facilities, which were even more advanced than those in Japanese houses. After viewing the exquisitely carved statues and monuments along the old street, they travelled to Fushun. There they were astonished by the largest mining operation in Asia, as it was almost as large as the old Nagasaki city. In XInjing they visited the magnificent buildings of the government offices. They then travelled by train from Changchun to Lushun, where they sought to visit historical monuments from Russo- Japanese War.

This site was particularly relevant, as the Navy camp of Lushun Dalian was the location where Anatolii Mikhailovich Stoessel, the Russian commander - who surrendered to Japan in the Russo-Japanese War, held a conference with the third army commander Nogi Maresuke in 1905. The students took a picture in front of the Navy camp, wearing school uniforms, hats of wartime color, leggings, and carrying bags on their shoulders. They were deeply impressed with the battle-fields of the Russo -Japanese War, especially the one known as "203 highland."

After visiting Lushun, the students embarked on their last tour to Dalian, a very prosperous free trade port. As a result, German-made cameras, clocks and watches were much cheaper in Dalian Duty Free Shop than in Japan. These German-made products were highly sophisticated, and students bought playing cards, pokers and chocolates as gifts. From Dalian Port they got on the cruise ship "Ouryokumaru," which weighed about 10,000 tons. On this trip to Moji, students played poker and had a great time, which provided a precious and happy memory during war time.

In Manchuria, students found quite a few amazing things that they had never seen in Japan. For example, the seats on a Japanese train could accommodate only two people, while the train they took in Xinjing was luxurious with seats wide enough for three people. In addition, the speed of South Manchuria Railway "Asia" was so fast that the Japanese domestic trains could not compete. Overall, the students admired the highly advanced technology with which the city was developed.

After they had visited both the cities in Manchuria and the war memorials, the students came to think of Manchuria as a fantastic place, and many began to dream of working or studying there. In fact, some of the participants in this interview later joined the army in Hangzhou, some went to work in the Manchuria Steel Factory, and several of their classmates went to study at Manchuria's JianGuo University.

Thus, this travel provided a powerful demonstration and justification to younger generations of the expanding policy of Japanese militarism. Indeed, the students visited only northeast China, which had been developed by Japan. Even if they walked on the streets, they could not find any Chinese figures, and they had no chances to talk to Chinese citizens at all. As they could purchase things in Japanese yen, the travel was essentially the same as school trips within Japan.

This trip had been planned before the students entered the junior high school, and students began to save for travel expenses from the beginning of the term. This was because the travel expenses were very high, costing around fifty yen per person, while in comparison the tuition fees at that time were three yen and fifty sen per month.

3. CONCLUSION

China and Nagasaki had enjoyed a close relationship for a long time, dating back to 1562 when Tousens landed in Nagasaki. In particular, in 1689 the Edo Bakufu built "Tojinyashiki," a Chinese quarter for Chinese residents. During the period of national isolation, "Tojinyashiki" and "Dejima" played an important role as the only windows to the world and to international exchange in Japan . Indeed, this close relationship provided the background for these popular school trips to China.

The 1896 Shanghai school trips by the Nagasaki Business High School opened the door to Japanese overseas school trips. From the Taisho period to the Second World War, some of the junior

high schools in Nagasaki went on school trips to Shanghai, following the example set by NBHS. Since the majority of Japanese residents in Shanghai at that time were from Nagasaki, even junior high school students felt that China and its people were very familiar.

This research has found that there were two different types of overseas school trips - Shanghai school trips aimed at internship training for overseas business purposes. However, the Japanese government used the Korea-Manchuria school trips to demonstrate the triumph of militarism and colonialism in East Asia, and thus to advance Japanese education about these ideas.

Details of the first overseas school trips proposed by the Nagasaki students revealed the open and pragmatic character of the Nagasaki people. Their travel plans were based on the "accumulated history of long term exchange with China."

In 1923, a ferry route opened between Japan and China. The ferries, Nagasakimaru and Shanghaimaru, had a voyage departing twice a week, and it took only twenty-six hours to travel from Nagasaki to Shanghai. The ferry was so convenient that the Nagasaki people began to say, "Why don't you go to Shanghai for shopping in wooden clogs (as we go to a nearby store)?" As a result, the people of Nagasaki came to feel familiar when visiting China, and they could obtain information about Shanghai through various channels.

However, in 1941, the Pacific War began, and in 1942, the ferry Nagasakimaru sank off the coast of Iojima after being hit by Japanse military mines. The second ferry, Shanghaimaru also collided with a cargo ship of the Nippon Mail Steamer Company in the Yangzijiang River in 1943. Consequently, the ferry route between Japan and China was abolished.

The interviews cited here reveal that students in the Nagasaki Junior High School did not discriminate against a Chinese classmate named Chen during the Sino-Japanese war. Furthermore, the interview participants did not think deeply about the significance of the travel at that time. However, looking back at history as well as at their own personal lives, they pointed out the lasting effects of the school trip. Through the school trip to China, many students came to study Chinese history, especially modern and contemporary history, in order to understand the relationship between China and Japan. Although they were also involved in militarism and colonialism when they first visited, the students also cultivated lifelong interests in China and widened their horizons due to this travel.

Despite that the Japanese invasion hindered the ability of both countries to maintain friendly relations, a series of school trips from Nagasaki to China provided a good opportunity for students to see China with their own eyes. These experiences would have a lifelong influence upon participants.

Real international understanding includes accepting foreign knowledge, and building communication with other people on the basis of mutual engagement. Such interaction is especially important during students' formative years in junior and high schools. As Chinese culture had already penetrated into people's lives in Nagasaki such as through the Lantern festival, the Nagasaki Kunchi, the Bon Festival and in Nagasaki China town, it was important for young people in Nagasaki to find their roots in China. The testimonies of the former students at the Nagasaki Junior High School make it clear that their trip cultivated many persistent interests in reaching mutual understanding between Japan and China, which extended beyond historical and political incidents.

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Application of Peace Education for ESD

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ABSTRACT: Atomic mob was dropped in Nagasaki and Hiroshima, and 68 years has passed. As Hibakusha who's directly experiences that horror of nuclear weapons age and their generation passes on, how will be able to maintain this history and teach future generation? Therefore, one of the issues of the matter is ”how to work peace education today “In this paper, authors believe the importance of peace education as ESD (Education for Sustainable Development), and gave the lesson about the rehabilitation from damage by the atomic bomb in Nagasaki, and researched the effect by lesson after that at Kawauchi elementary school in Fukushima. As a result, we realized that it is important that the arrangement for teaching experience of Nagasaki depends on regions and children.

1. INTRODUCTION

In this research, The term “Peace Education” can be defined as that maintain the accomplishment of conventional peace education in Japan and challenge to recover the blind sides. Main contain of current peace education is experiences of WW Ⅱ including those of Nagasaki and Hiroshima. But that has the blind side that WW Ⅱ is just past events as children today and it is difficult of them to feel abstract matter. Therefore we're willing to more ahead that peace education based on the theory of ESD. Through ESD we could meet all needs of present without compromising the ability of future generations to meet their own needs. This vision of development embraces environmental concerns as well as issues such as the fight against poverty gender quality, human rights for all. For the purpose, it is necessary for that to abolish of racial discriminations and promote effective use of resource, construct affluent society for future generations. Much more realization of peace society is one of the most important issue.

2. METHOD OF THIS RESEARCH

2.1 Class practice

Subject of students: six grade at Kawauchi elementary school
Number of students: 5, **Date:** December 2, 2013

Aim of the class: In this class, Children are able to know the process of reconstruction of up to current Nagasaki city from postwar by knowing the contrasting state of situations before and after August9, 1945. In addition, with hearing to the Hibakusha's testimony and thinking about the feeling of Hibakusha, they can get the opportunity to think not only physical reconstruction but also mental rehabilitation of people who was experienced of war. Then finally as a lesson learned of this class, I want children to be interested for the reconstruction of their hometown after Great East Japan Earthquake.

Table 1. Teaching Plan

Procedure	Process of the class			Time
	Activity of children	Work by Teacher and teaching materials		
Introduction	1.understand about restored Nagasaki after August9,1945	Material 1 The Pictures of the Nagasaki before and after atomic bomb	○Give a question with next strings"1945.8.9.11.2"and saying what is meaning of this numbers, then Children will associate the meaning of strings that atomic bomb was dropped on Nagasaki city .	5min.
Evolution	2. Read the Hibakusha's story by lecturer (about Mr,Fukahori)	Material 2 Reading materials	○ Read the Hibakusha's story. After that, When teacher will add a description ancillary to imagine the suffering of the people and of the dire situation after the bombing,	35min.
	3. Comparing the state of the current and 68 years ago in Nagasaki city with pictures	Material 3 ・Pictures of current landscapein Nagasaki ・Pictures comparing current and just after bombing at Urakami church and Sannou shrine	the children will get to think the approach to Hibakusha. ○Teacher side describes the state of the current Nagasaki city by comparing the pictures of current and 68 years before taken at the same location. Then, children can understand the reconstruction of the Nagasaki city in detail.	
	4. Watching the video message from Hibakusha and think about "strength of man" and "will to inheritance and postwar rehabilitation of Hibakusha"	Material4 Video massage from Hibakusha	○A teacher tell the children that Hibakusha Mr,Fukahori is still alive and then children will bring back the video massage by him.	
	5 Create ideal future hometown on the large format paper	Material 5 Ready one map of Kawauchi village(Large format paper) Many pictures of facilities are also prepared.	○Children will create a map of Kawauchi village`s ideal future on the large format paper. Stuck the map on the board, put the illustrations of factory and school, park and so on by reference to the each own lives.	
	6. Raise the will of thinking about the future of the hometown and the hope of rehabilitation of the hometown		○Finally Children will get Their hometown vision with the map. And share their each ideas and opinions Through these activities, Children can be aware of love for their home town and feel a sense of rehabilitation from Great East Japan Earthquake.	5min.
Summary				

Figure1 Map with future ideal hometown vision that Children draw in the class

2.2 Questionnaire Investigation After the Class

Subject of students: six grade at Kawauchi elementary school (Number:5)

Date of survey: December 2, 2013 (Just after the class)

Give ranking according to the five grade (Excellent, Good, Average, Fair, Poor) in each questionnaires.

The questionnaires are like bellow lists.

1. How did the whole contents of the class? (Figure2)
2. How did you understand the whole contents of the class? (Figure3)
3. How did you understand about revival of Nagasaki? (Figure4)
4. Did you have a growing mind in" reconstruction of your hometown "by this class? (Figure5)
5. Did you have a chance to think about your hometown's future this class? (Figure6)
6. Please puts a priority on 1~5, depends on that it was impressive for you.(Figure7)

3. RESULTS

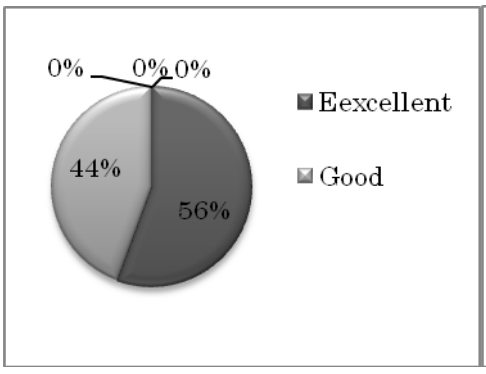


Figure 2 Satisfaction of entire class

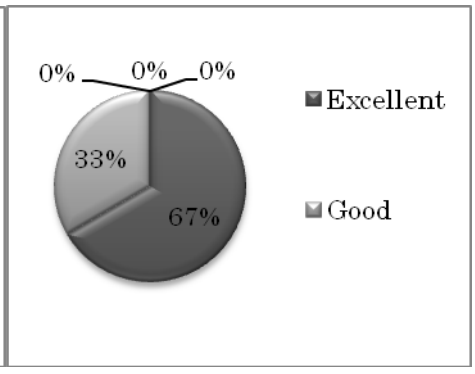


Figure 3 Comprehension degree of entire class

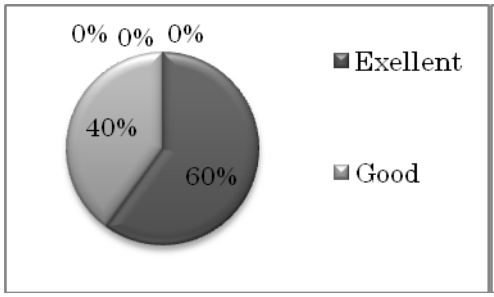


Figure 4 Comprehension degree about revival of Nagasaki

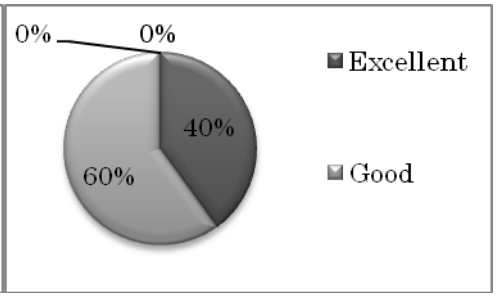


Figure 5 Improvement of interest degree about revival of Nagasaki

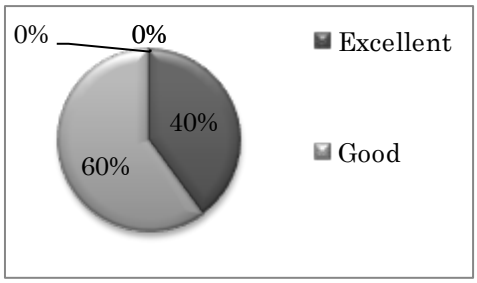
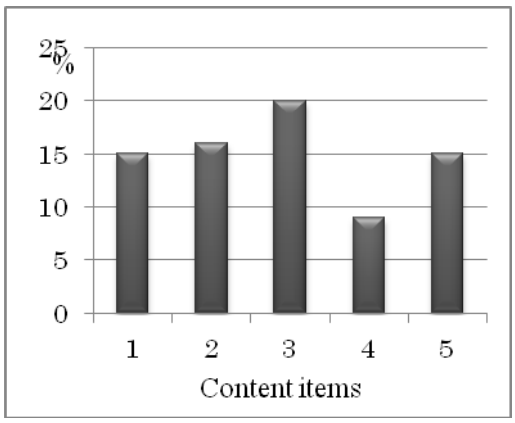


Figure 6 Effectiveness as a good chance to think about the future of hometown



INDEX

1. Reading Hibakusha's story
2. Watching film (message from Hibakusha)
3. Thinking about future of hometown on the paper
4. Exchanging of opinions
5. Comparison pictures before and after atmic bomb of Nagasaki

Figure 7 Content items of the impressive class

From the whole results, all contents of class are intended to generally satisfactory for children. The result o figure7 shows us "thinking future hometown on the paper" activity was most impressive for children. And then the "reading Hibakusha's story" and "watching a video message from Hibakusha" are following good in rank. It means us that the personal focused contents makes thinking mind about damages by an atomic bomb for children.

4. CONCLUSHION

It is carried out in one-off classes as part of the sustainable development education the class theme of the Nagasaki atomic bomb and postwar rehabilitation with different places where distinctive and regional background is a little difficult. However, it would not get sufficient effects in the class in less than an hour. If possible, it is desirable to make a consistent curriculum at least a few

hours to learn about peace comprehensively.

In this curriculum, children can learn about basic knowledge of atomic bomb and regional background and features of their own hometown. It'll lead to more effective learning. We can feel that Nagasaki's story after Augusut 9, 1945 is the material of good learning for children in other area of Nagasaki and Hiroshima. Therefore it is important that teachers understand firmly about children and learn regional features and background, in other to study teaching materials well. It is also important to make an example of the lesson of universal peace education that can be implemented in any regions. But it's necessary to grasp firmly the background of leaner as well as age, in other to have the attitude that teacher's own keep learning widely in order to carry out peace education as ESD more effectively.

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A Study on LIDAR Data-based Street Trees Service Methodology using Open Sources

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ABSTRACT: The street trees provide green area at urban areas to absorb carbon dioxide and to alleviate heat island. In South Korea, local governments managed street trees in different ways depending upon regions so that standardized system should be made. This study made standard items for management of street trees by not only location information on street trees based on aerial LIDAR data but also local governments' case study to suggest street tree management and service system by using open sources.

1. INTRODUCTION

The street trees could produce green areas for citizens in modern society who were forced to live at downtown contaminated by smoke and dusts, and it increased psychological stability to lower damages caused by atmospheric contamination. Local governments had managed street trees in different ways so that standardized management system was needed (Kim, 2008).
In South Korea, width of crown by modeling of each type of street tree growth was suggested from point of view of management of street trees to research better environment of street tree areas (Lee, 2012), and in foreign countries, database system was computerized by not only national parks' tree management information but also GIS analysis to evaluate trees (Isa, 2012).
This study investigated management items of street tree of each local government to find out standardized street tree information service and to develop street tree information service system by using Google Earth plug-in and C# program language.

2. MANAGEMENT STATUS OF STREET TREES BY LOCAL GOVERNMENT AND SERVICE ITEMS DERIVED

This study investigated types, organizations and items of management and features of four local governments to find out street tree service items like Table 1. The management system was made in shape file, CAD file, management ledger of tree and various kinds of other ways, and management items were classified in different ways, so that standardized service items should be urgently made to manage street trees.
The study found out common service items like Table 2 based on local governments' management items in Table 1. The common services had number from 2 to 10, and address of road name(or new address system) should be used from the year of 2014 to add street tree service item to manage street tree by road name.

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Table 1. Management status of street trees by local governments

、	Local government A	Local government B	Local government C	Local government D
Type of management	Exel file, shape file, CAD file	CAD file	Document	Shape file
Managing Agency	The ministry is different about tree management by local government			
Item of management	Number	Number	Number	Number
	Address	Address	Address	Address
	Tree name	Name of road	Tree name	Tree name
	Spatial information	Tree name	Road width	Number of section about road
	Length of road	Code of tree	Type of road	Code of tree
	Management by local government	Statistic of management	Management by local government	Management by local government
	Jibun	Jibun	Jibun	Jibun
	Existence and nonexistence of tree cover	Existence and nonexistence of tree cover	Existence and nonexistence of tree cover	Existence and nonexistence of tree cover
	Level of tree	Point of start and end	Data of created tree	Point score about damage
		⋮		⋮
	Date of tree planted	Number of ledger	Business expenses	Date of tree planted
	Coordinate X,Y	Tree height	Extension of distance	Tree height
	DBH	Quantity of tree	DBH	Number of map
	Height of tree	Standard	Age of tree	Age of tree
Feature	- Created number about tree. - This system has planned well by tree information than other system,.	- This system controls information with CAD program. - This system is difficult about how to know information from each of tree.	- This government has management of ledger which had made the court. - This system is difficult about how to know information from each of tree.	- This system is difficult about how to know spatial information of tree. - Tree is controlled by each of management.

Table 2. Standardized item of street tree service

Item of street tree service			
1	Address about name of road	6	Management by local government
2	Number	7	Existence and nonexistence of tree cover
3	Address	8	Tree name, code of tree
4	Jibun	9	Number of management
5	Tree height	10	Date of tree planted

3. DEVELOPMENT OF TREES INFORMATION SERVICE SYSTEM

Not only C# program language but also Google Sketch UP program was used to construct street tree information service system as depicted in Figure 1. Database with standardized street tree service ite ms and spacial information was used to connect street tree information system and to produce 3D mo del of each type of street tree by using 3D ArcStudio Plug-
in of Google Earth. Not only street tree information database but also 3D model was used to produce KML/KMZ, and Google Earth for using of various kinds of platforms was used to give 3D service.

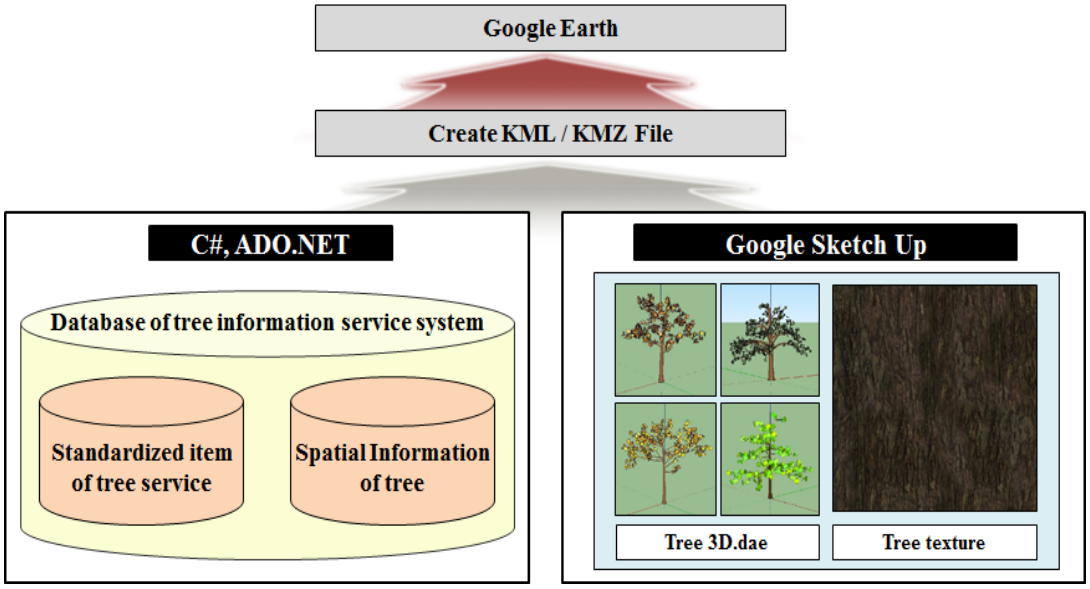

Figure 1. Concept of Trees information service system

The street tree information service system's screen configuration is like Figure 2, and opening, editing, saving, distance measuring and KML/KMZ file production of street tree database were made to give service of street tree 2D/3D models based on Google Map.

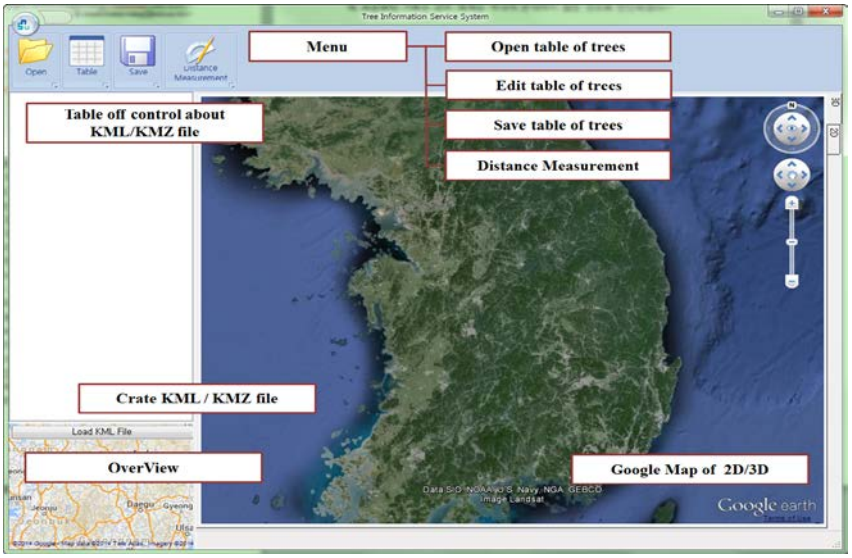

Figure 2. Screen of trees information service system

4. EXPERIMENT

The study area is around Yongin City hall in Gyeonggi-do to develop street tree information service system, and Figure 3 is street tree location data that was produced by aerial LIDAR data processing. Current situation information for management of street trees was collected from Yongin City to integrate it with street tree location information and to construct database of ten of common service items.

No#	Code	Tree name	English name	Scientific name	Name of road	Address	X	Y	Z	DBH(m)	Width of Crown(m)	Height of tree(m)
1	CR0	Chinese fringe...	Retusa	Chionanthus	giheungro 1_1	giheunn...	36.912282758864	127.143763905189	6.97827094	1	2	3
2	GB0	Gingko	Ginkgo	Ginkgobiloba	giheungro 1_2	giheunn...	36.912079782312	127.143618095264	5.5141449	4	5	6
3	LT0	Tulip	tulip	Liriodendro	giheungro 1_3	giheunn...	36.911738	127.143069	6.0461731	7	8	9
4	MG0	Metasequoia	Metasequoia	Metaseq	giheungro 1_4	giheunn...	36.911621	127.14307	6.20555115	10	11	12
5	PO0	Platanus occi...	Eastern	Platanus	giheungro 1_5	giheunn...	36.911622	127.143121	5.10334015	13	14	15
6	PS1	Cherry tree	Cherry	Prunusserr	giheungro 1_6	giheunn...	36.911593	127.143195	5.70859528	16	17	18
7	CR0	Chinese fringe...	Retusa	Chionanthus	giheungro 1_7	giheunn...	36.911545	127.143244	6.47847748	19	20	21
8	GB0	Gingko	Ginkgo	Ginkgobiloba	giheungro 1_8	giheunn...	36.911498	127.143264	5.24520111	2	32	24
9	LT0	Tulip	tulip	Liriodendro	giheungro 1_9	giheunn...	36.911438	127.143255	7.60829163	32	24	29
10	MG0	Metasequoia	Metasequoia	Metasequo	giheungro 2_1	giheunn...	36.911299	127.143106	6.81908417	5	44	21
11	PO0	Platanus occi...	Eastern	Platanusoc	giheungro 2_2	giheunn...	36.911121	127.143098	5.56496429	5	8	7
12	PS1	Cherry tree	CherryBlosso...	Prunusserr	giheungro 2_3	giheunn...	36.911038	127.143059	6.6732254	67	7	6
13	CR0	Chinese fringe...	Retusa	Chionant	giheungro 2_4	giheunn...	36.910932	127.14301	3.05606842	7	8	6
14	GB0	Gingko	Ginkgo	Ginkgo	giheungro 2_5	giheunn...	36.910843	127.142968	12.19076304	5	5	6
15	LT0	Tulip	tulip	Lirioden	giheungro 2_6	giheunn...	36.910778	127.142936	12.06092834	4	3	5
16	MG0	Metasequoia	Metasequoi	Metasequoia	giheungro 2_7	giheunn...	36.910722	127.142905	12.0853653	3	2	4
17	PO0	Platanus occi...	Eastern	Platanus	giheungro 2_8	giheunn...	36.910683	127.142887	11.227765031	3	6	2
18	PS1	Cherry tree	Cherry	Prunus	giheungro 2_9	giheunn...	36.910682	127.142837	12.86779785	4	4	2
19	CR0	Chinese fringe...	Retusa	Chionanthus	giheungro 3_1	giheunn...	36.910538	127.142813	11.71047974	2	3	2
20	GB0	Gingko	Ginkgo	Ginkgobiloba	giheungro 3_2	giheunn...	36.910491	127.142791	12.95733643	1	4	2
21	LT0	Tulip	tulip	Liriodendron	giheungro 3_3	giheunn...	36.910444	127.142766	11.9205246	1	2	2
22	CR0	Chinese fringe...	RetusaFringe	Chionanthus	giheungro 3_1	giheunn...	36.910538	127.142813	11.71047974	2	3	2
23	GB0	Gingko	Ginkgo	Ginkgo	giheungro 3_2	giheunn...	36.910491	127.142791	12.95733643	1	4	2
24	LT0	Tulip	tulip	Liriodendron	giheungro 3_3	giheunn...	36.910444	127.142766	11.9205246	1	2	2

Figure 3. Extracted street tree from LIDAR data and construction of database

The study developed street tree information service system as shown in Figure 4 based on database of street tree in Figure 3. The study made edit and update of individual street tree information by the system, and provided 2D and 3D map to develop functions to examine 3D models of each kind of tree and to measure distance simply.

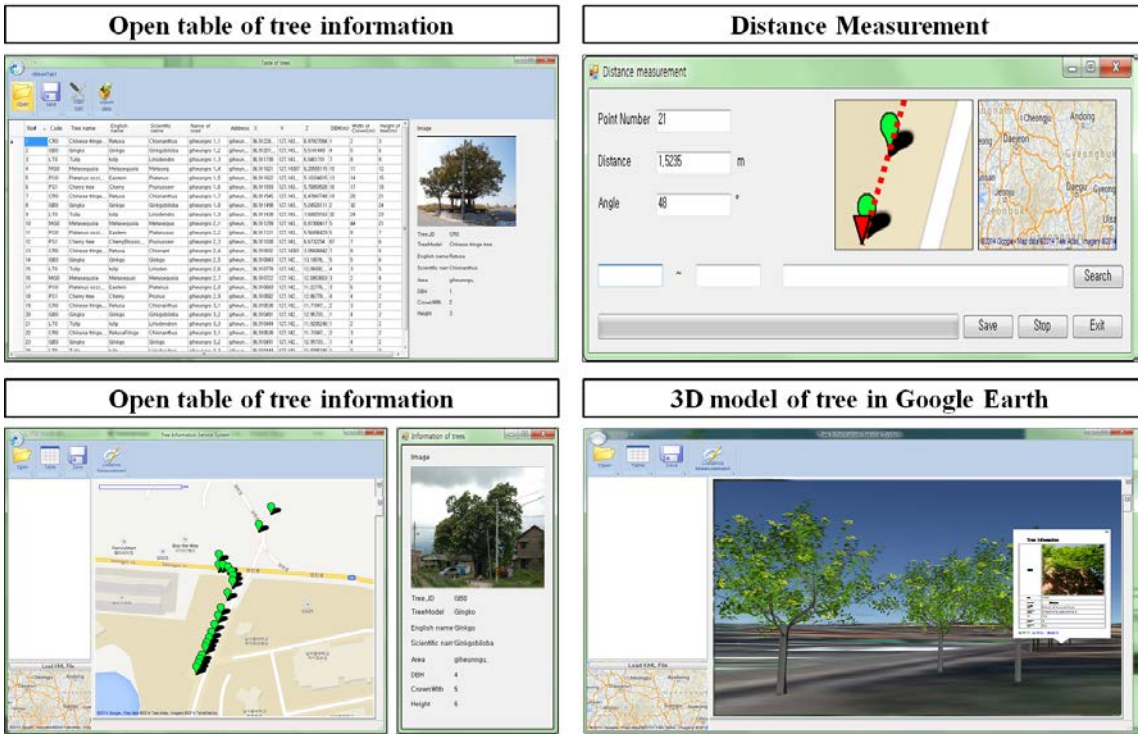

Figure 4. Screen of tree information service system

5. CONCLUSION

This study investigated management items of street trees of each local government to find out common service items and to produce 3D models of each type of street tree and to develop street tree information service system.

First, at investigation into street tree items of each local government, management items were not uniform so that it needed to standardize to work efficiently from point of view of management of street trees.
Second, person in charge of street trees of the local government could manage street trees in two-dimensional and three-dimensional environment through the developed street tree service system by deriving standardized and common street tree service items. Moreover, it was possible to efficiently provide street tree information to common users.

Further studies were needed to investigate street tree service standards and service systems of many local governments to evaluate effectiveness of actual job.

Acknowledgement

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Classification Methods of Terrestrial LiDAR data set using Fuzzy set theory

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ABSTRACT : Through the application of a fuzzy set theory during the classification process and by quantifying and objectifying the ambiguousness of a subjective belief or determination, the reliability about the treatment results can be improved.

To this end, a wooden board, concrete were fabricated into 40 cm x 40 cm test models and the raw data obtained from the terrestrial LiDAR were classified through the use of a fuzzy set theory. As a result of measuring the accuracy of classifying between the wooden boards-and-concrete accuracy of about 95%～96% was observed.

Therefore, confirmed is the fact that satisfactory results can be obtained by classifying the color information values and reflection intensity values from the terrestrial LiDAR, through the use of the fuzzy set theory.

1. INTRODUCTION

A LiDAR(Light Detection And Ranging) system can directly acquire high-density 3-dimensional location information (X, Y, Z), characteristic information (red, green, blue), and reflection intensity information, which are earned through scanning numerous laser pulses at close intervals onto the surface of what is to be observed.

In particular, a terrestrial LiDAR system is increasingly utilized in various fields like artificial slanting topography, structure survey, current condition survey, cultural asset survey, shoreline monitoring survey, tunnel survey, displacement monitoring survey, and 3D image contents construction, since it has easy access to objects and can acquire more precise 3-dimensional information.

However, the capacity of raw data from terrestrial LiDAR is excessively accumulated because high-density and high-precision data are acquired, and the data include not only observed objects but also many obstacles like vegetation, trees, and structures. It is why raw data from terrestrial LiDAR needs to be classified in order to extract necessary or unnecessary data. The classification is the most important among preceding processing processes, since it greatly affects the analysis and accuracy of the data.

Yet, preceding processing technologies have non-uniform classification accuracy depending upon geographical environment, the kind and arrangement of surrounding elements, and the shape and quality of what is to be extracted. Moreover, the classification accuracy will vary with the judgments of the worker or researcher.

In recent days, more accurate classification techniques have been developed, which can overcome many weaknesses of classic classification techniques and can relatively minimize the effects of many environmental factors on classification results. Of them, the most representative is the fuzzy

classification technique, which uses a fuzzy set theory.

When two kinds of objects are classified using the theory, there will appear an ambiguous and unclear overlapped interval, which can be set as a fuzzy interval for classification.

So, if the fuzzy set theory is applied to the classification of terrestrial LiDAR data, the reliability and accuracy of processing results can be improved by means of quantifying and objectifying subjective and/or ambiguous thoughts or judgments.

2. APPLICABLE THEORY

2.1 Fuzzy logic

Fuzzy logic is a theory used to turn subjective and ambiguous thoughts or judgments into quantitative ones, on the assumption that most natural languages used by men have an ambiguous meaning. For example, the boundary of "a worn-out building" cannot be clearly cut since men often use obscure terms. Figure 1 describes the level of deterioration of a building as a way for explaining the concept of fuzzy logic.

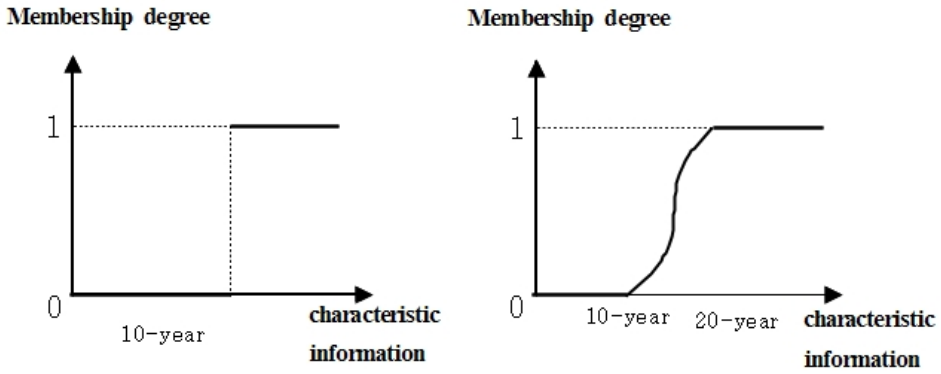


Figure 1. "Deterioration of a building" defined according to fuzzy and conclusive logics

Figure 1 is an example of the deterioration of a building based on the period after its construction. The left side of Figure 9 considers that 20-year old or older buildings have deteriorated and less aged buildings have not. Nevertheless, such a clear-cut separation is so unnatural that it leads to the severance of thoughts and it cannot fully reflect general thoughts of men about "deterioration." In contrast, the right side of Figure 9 has a natural boundary and it can approach near to the thoughts of men. In this manner, fuzzy logic will reach a better conclusion since it adopts ambiguous expressions used by men as they are and reduces the loss of information.

2.2 Fuzzy set

The value of a common membership function is 1 or 0 since, if element x belongs to general set A, membership function $\mu_A(x)$=1; or, if it does not, $\mu_A(x)$=0.

Meanwhile, in a fuzzy set, the value of a membership function may be any numeral not only between 1 and 0 but also between 1 and 0. The possibility that element x is a member of fuzzy set A is expressed as $\mu_A(x)$, and it is a numeral between 0 and 1.

2.3 Fuzzy membership function

SI model membership function is classified as a S-type membership function, as shown in Figure 2, depending on the location of an independent interval and a fuzzy interval in the population of data.

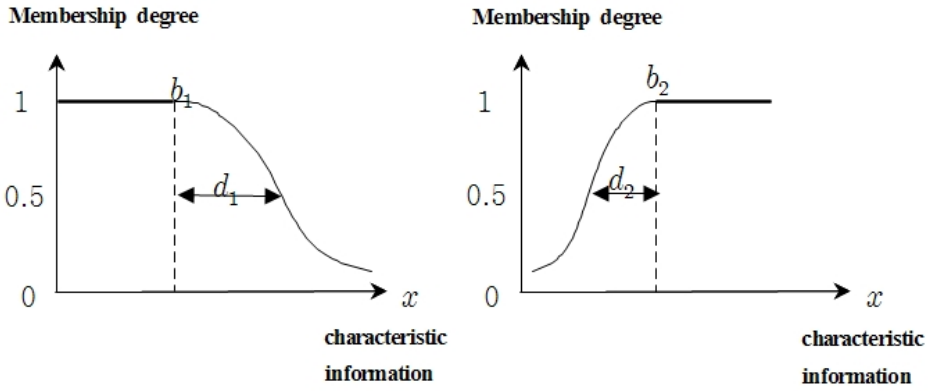


Figure 2. S-type membership function

This research calculates the categorization and fuzzy interval of supervised and classified sample data from terrestrial LiDAR and the membership degree values of terrestrial LiDAR data sources by using S-type membership functions such as formula (1) and formula (2) depending on the location of fuzzy interval.

$$\mu_A(x) = \frac{1}{1+((x-b_1)/d_1)^2} \tag{1}$$

$$\mu_A(x) = \frac{1}{1+((x-b_2)/d_2)^2} \tag{2}$$

3. APPLICATION AND EVALUATION

3.1. Acquiring the data

As shown in Figure 3, a 40cm x 40cm experiment model was produced using wooden board, vegetation, concrete, tile, and marble. Seen in Figure 5 is the terrestrial LiDAR equipment set up 1.8m away from this experiment model, and scanned at 5mm intervals. Raw data derived from the experiment are listed in Figure 4.

Figure 3. Model photo **Figure 4. LiDAR raw data** **Figure 5. Acquiring data from The experiment model**

Raw data acquired from terrestrial LiDAR are composed of 3-dimensional point clouds, and the file of the data is saved through IMP, which is an exclusive format for ScanStation2 and contains 3-dimensional information of the object comprising X, Y, Z, and Color. Then, LiDAR data are exported to PTS file by means of Cyclone 7.0, which is ScanStation2 exclusive software and imported by a program developed based on AutoCAD, so as to acquire 3-dimensional coordinates (X, Y, Z) and characteristic information values (R, G, B, I).

3.2. Extracting characteristic information values for each factor

A point cloud earned from the scanning of terrestrial LiDAR has 3-dimensional coordinates (X, Y, Z), color information values (R, G, B), and reflection intensity value (I). Therefore, it can be utilized to classify LiDAR data against color information values and reflection intensity values acquired from the experiment model. Consequently, in this research, in order to classify wooden board and concrete, color information values and reflection intensity values are extracted from wooden board 3,333 Point and concrete 3,101 Point, and listed in Table 1.

Table 1. Characteristic information values of both the 1st(wooden board) and 2nd(concrete) factors

Class / Point	1st(wooden board)				2nd(concrete)			
	R	G	B	I	R	G	B	I
No.1	28	37	28	682	35	55	34	691
No.2	22	42	29	679	25	48	27	682
No.3	25	41	28	685	38	47	39	687
No.4	27	34	31	660	27	44	40	710
No.5	31	35	29	668	31	42	41	708
…	…	…	…	…	…	…	…	…	…

3.3. Calculating fuzzy intervals

As is seen in Figure 6, spheres are set for wooden board and concrete, among raw data of terrestrial LiDAR earned from the experiment model. Also, Table 2 calculates the characteristic information values of factors and characteristic information factors in each class at overlapped fuzzy intervals.

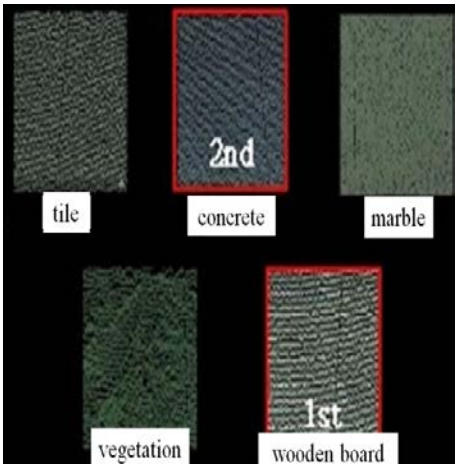


Figure 6. Setting spheres

Table 2. Distribution of characteristic information values of factors (wooden board-concrete)

characteristic information / Class	R	G	B	I
1st(wooden board)	15 ~ 38	22 ~ 47	20 ~ 31	652 ~ 712
2nd(concrete)	21 ~ 56	31 ~ 82	25 ~ 56	670 ~ 730
fuzzy interval	21 ~ 38	31 ~ 47	25 ~ 31	670 ~ 712

As seen in Table 2, when a classification is made based on one class information value, the accuracy of the classification may be hampered due to excessive overlapping of information values. So, information on overlapped intervals is defined as a fuzzy interval; characteristic information values of factors at a fuzzy interval are applied to a fuzzy membership function, and then the results are utilized as basic data to calculate membership degree values.

3.4. Membership degree values

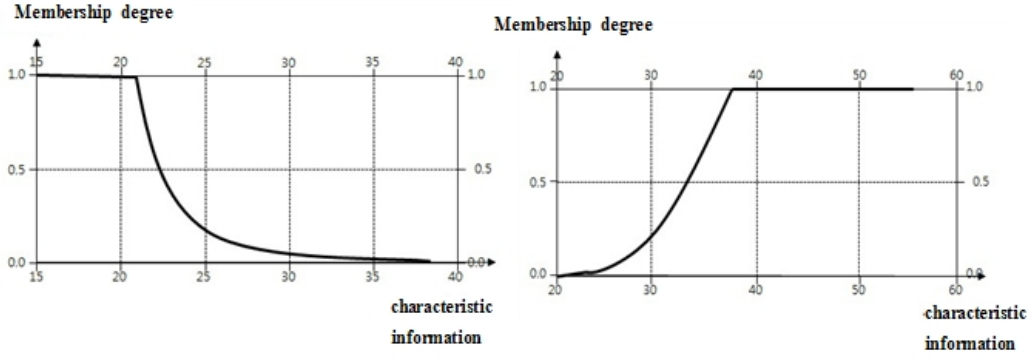
Samples of each classification item(class) have a certain level of overlapping, and a general classification has an error due to such unclear membership information values. Therefore, in order to minimize such errors and numerically quantify unclear membership information values, membership degree values need be calculated.

So, Table 3 uses formulas 1 and 2 to calculate membership degree values at fuzzy intervals between wooden board and concrete.

Table 3. Membership degree values (wooden board-concrete)

Class / Point	1st(wooden board)				2nd(concrete)			
	R	G	B	I	R	G	B	I
No.1	0.87	0.89	0.84	0.93	0.97	0.82	0.84	0.81
No.2	1.00	0.70	0.75	0.96	0.66	1.00	0.75	0.67
No.3	0.95	0.74	0.84	0.89	1.00	1.00	0.43	0.75
No.4	0.90	0.97	0.58	0.95	0.73	0.97	0.38	1.00
No.5	0.76	0.95	0.56	1.00	0.87	0.92	0.33	0.99
…	…	…	…	…	…	…	…	…

Further, among the calculated membership information values, color information “R” value is used to identify the distribution of membership degree values, which is shown in Figure 7.



1st(wooden board) 2nd(concrete)

Figure 7. Distribution of membership degree values based on characteristic information values of each factor

As for a membership function of a fuzzy set, the membership degree marks 1 at the center of the set or marks 0 at the fuzzy boundary, which is an external sphere. A point where membership degree is 0.5 is called the intersecting point. The location of an intersecting point plays an important role in deciding membership degree values.

Moreover, as the membership degree value approaches nearer to "1," the probability for its being a member of the appropriate classification item is higher and almost all membership degree values have around "1" and some membership degree values have membership degree values whose intersecting point marks less than 0.5.

As seen in the above Figures and Tables, membership degree values of 1st or 2nd class factors are compared to their membership degree reference values and are allotted to a classification item(1st or 2nd class), in which the probability of their belonging is high. And if membership degree values of factors do not meet the criteria for their classification, they will not be allotted to any specific classification item. It is to prevent the factors from being classified into a specific classification item, ensuring that their classification error is minimized and the probability of their being a classification item is objectively analyzed.

3.5. Membership degree reference values

Membership degree values calculated using a fuzzy membership function are values counted based on characteristic information values which comprise such errors as mechanical error of terrestrial LiDAR, dispersion of laser light, unclear boundary between objects, surface materials, and surrounding environments (luminous intensity, temperature, wind, and others). So, in order to minimize systematic error, accidental error, and others that may take place in the process of measuring, membership degree reference values need be decided after membership degree values are used to calculate the standard error.

$$S_e = \sqrt{\frac{\sum (Z_i - \hat{Z}_i)^2}{n-2}} \tag{3}$$

Z_i: reference value of the membership of an object
$\hat{Z}_i$: membership degree value based on characteristic information value of factors
n: number of terrestrial LiDAR points at a fuzzy set interval

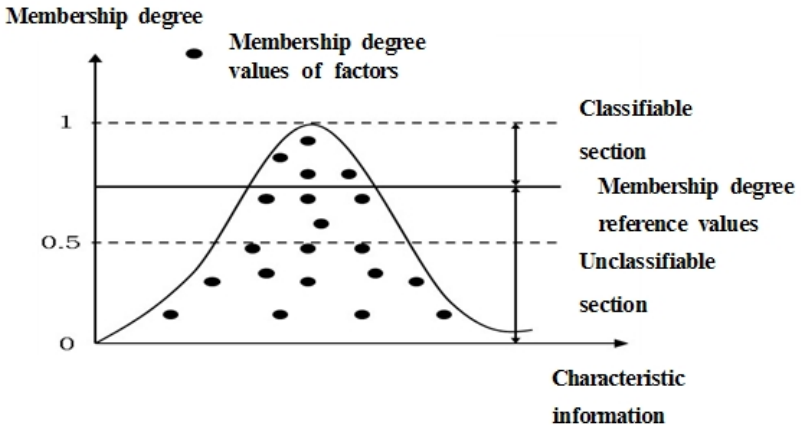


Figure 8. Distribution of membership degree values of terrestrial LiDAR data

Characteristic standard error values of factors calculated according to formula 3 are used as a reference to define critical values at intervals separated from the center of SI model membership function graph (0.5) by the standard error value. Therefore, LiDAR observation data contained in these intervals are excluded from the appropriate classification item since the probability of their overlapping is high.

Membership degree reference values, which are a criterion for judging that factors can be classified into a classification item, are calculated by using formula 8.

$$M_V = 1 - \sqrt{\frac{\sum (Z_i - \hat{Z}_i)^2}{n-2}} \tag{4}$$

Table 4 lists color information values (R, G, B) in each class and membership degree reference values of a reflection intensity value (I).

Table 4. Membership degree reference values of 1st(wooden board) and 2nd(concrete) items

characteristic information / Class	R	G	B	I
1st(wooden board)	0.29	0.18	0.58	0.3
2nd(concrete)	0.14	0.26	0.5	0.28

3.6. Classification based on binary logic

Whether a factor is or is not a member of a classification item is decided based on binary logic(true/false) by using membership degree reference values earned from membership degree values of terrestrial LiDAR data sources. When a membership degree value is larger than a membership degree reference value, the independent sample value of a classification item is found to be 'true'; when it is smaller than a membership degree reference value, the independent sample value is proved to be 'false', since the probability for the overlapping of boundaries between classification items is high.

$$\text{True} = \mu_A(X) \geqq M_V \tag{5}$$

$$\text{False} = \mu_A(X) < M_V \tag{6}$$

$\mu_A(X)$: Membership degree values

M_V: Membership degree reference values

Table 5 shows 'true or false' after a comparison was made between membership degree values in Table 3 and membership degree reference values in Table 4.

Table 5. Classification based on binary logic for 1st(wooden board) and 2nd(concrete)

Class / Point	1st(wooden board)				2nd(concrete)			
	R	G	B	I	R	G	B	I
No.1	True	True	True	True	True	True	True	True
No.2	True	True	True	True	True	True	True	True
No.3	True	True	True	True	True	True	False	True
No.4	True	True	True	True	True	True	False	True
No.5	True	True	False	True	True	True	False	True
…	…	…	…	…	…	…	…	…

When LiDAR Point raw data in each classification item meet the criteria, the reflection intensity (I) value will be preferentially classified among factor items.

In other words, since each object in a space has its own color or a similar color, it cannot be classified against its color only. So, because artificial grass and natural grass, which have a similar color, may be proven to have the same color factors (R, G, and B values), they shall be classified against their reflection intensity (I) value, which is a laser reflexibility determined according to the surface material and characteristics of an object.

Now that the membership degree reference value has been decided, it shall be compared to the membership degree value for judging that an object is true or false. However, being 'true' will not guarantee that it is classified. When R, G, B, and I bands are all proven to be true, then it can be classified; however, if any of the bands which are characteristic information values of factors in a classification item are proven to be false, it shall not be classified.

3.7. Classification results

Figure 9 lists the results of a classification made under the assumption that the 1st(wooden board) is red and the 2nd(concrete) is blue according to a fuzzy set theory.

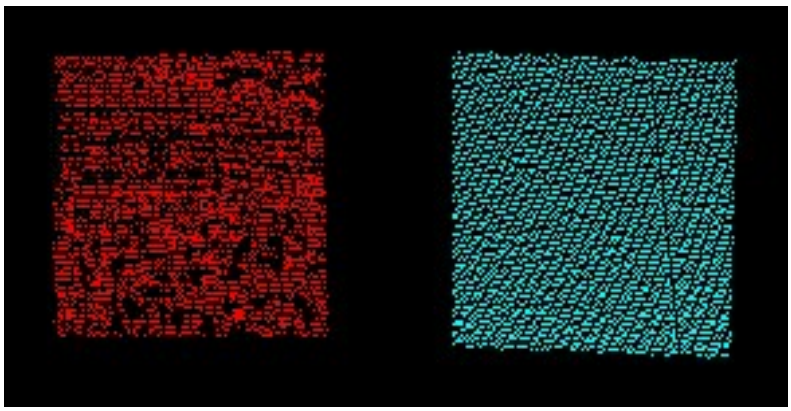


Figure 9. Results of the classification of 1st(wooden board) and 2nd(concrete) items

3.8. Accuracy evaluation

This experiment evaluates the classification accuracy against two classification items (1st class and 2nd class).Theclassification accuracy evaluation involves such classification items as wooden board a nd concrete.

Table 6. Accuracy of the classification of wooden board and concrete

classification data / standard data	wooden board	concrete	total	Accuracy(%)
wooden board	3,151	182	3,333	94.54%
concrete	110	2,991	3,101	96.52%
total	3,261	3,173	6,434	95.47%

4. CONCLUSION

In order to classify raw data acquired from terrestrial LiDAR, a 40cm x 40cm experiment model was produced with wooden board, vegetation, concrete, tile, and marble. Then, the raw data was classified using a fuzzy set theory and the following results were derived.

First, an evaluation was conducted of the accuracy of the classification of wooden board and concrete and it was found that the classification accuracy is 95.47%.

Therefore, it was verified that satisfactory results could be earned when, of terrestrial LiDAR raw data, color information values and reflection intensity values are classified using a fuzzy set theory.

Second, it was found that an objective classification is possible since a classification using a fuzzy set theory minimizes errors compared to existing classification techniques. It is presumed that classification techniques will be enhanced in the future when such a method is developed in which more than 3 spheres can be classified at the same time.

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Development of Life- Safety Information Service Model

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ABSTRACT: Amid that the interest in public safety is increased, it is not provided any service for people to feel its effect on their safety. Therefore this study aims to develop a service model to really apply the life safety information. For this purpose, this study analyzed domestic and foreign cases, legislations relevant to the life safety, and then established 3 model types of walk safety service, traffic accident safety service, and crime safety service. In addition, if these models utilizing scenarios drawn on this study are based, it is expected that a user-centered service can be provided.

1. INTRODUCTION

Recently in Korea, people life safety map are implemented on a trial basis, but the researches about developing models to provide life safety information concerning social disasters are lacked.

Therefore this study drew existing services' problems by comprehensively analyzing domestic and foreign status quo about life safety services, similar kinds of services and their functions, and relevant laws & regulations and concerned institutions' databases (DBs), and then representative service types relevant to the life safety, and tried to draw some appropriate service scenarios for Korean situation.

2. ESTABLISHI OF LIFE-SAFETY SERVICE MODEL

2.1 Life-Safety Definition

Life means the essential activities for the human to conduct for surviving and living, so there are various life kinds like employment life, social life and home life as well as securing food, clothe and shelter. Lexical meaning of safety is the state without any danger cause or the condition establishing the preventative action for the human in order not to be hurt from such a danger cause.

Therefore, the meaning of life safety indicates the condition establishing preventative actions from any disaster or accident's happening while the human does his/her employment life, social life and home life considered as the representative 3 life fields.

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Concerning that, the model flow chart of life safety information service can largely divide into 3 categories of service analysis, establishment of service goal model, and drawing service-utilizing scenario and establish suitable models like seen in the Figure 1. In the section of analysis on current services, this study analyzed current service status quo through the analysis on executing legislations, domestic and foreign similar services and their functions, and concerned institutions' DB. In the section of establishment of service goal model, this study divided services into 3 service types of walk safety service, traffic safety service, and crime safety service, and established service goal model range for each service type. For that, this study established the final life safety information service model by drawing utilization process scenarios.

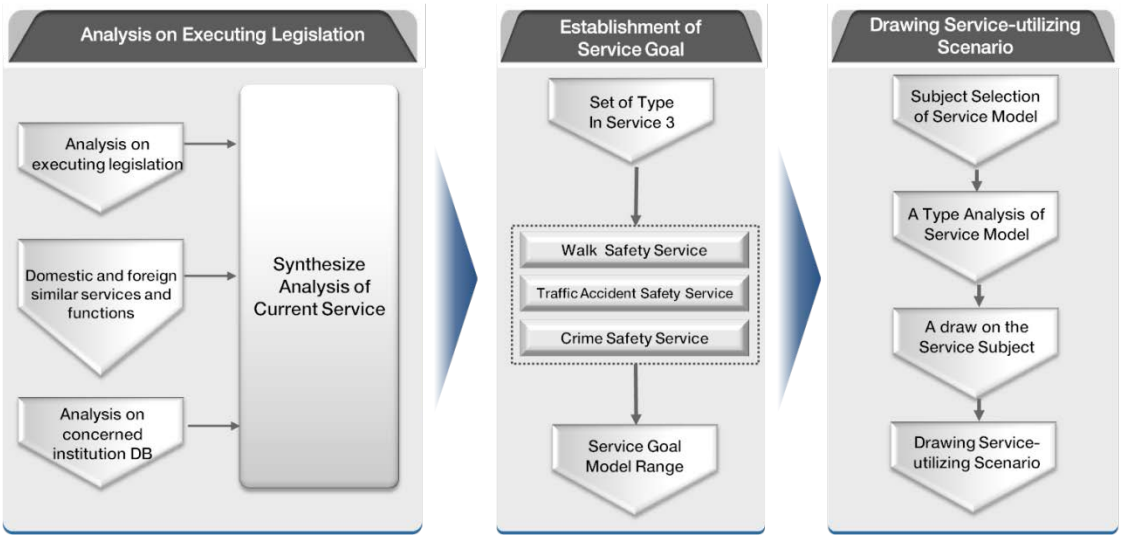

Fig 1. Life-Safety Information Service Model Flow Chart

2.2 Current Legislation Analysis

Life safety-relevant laws can be divided as seen in Table 1, and concerning the classifications of legislations, it was identified that the legislations about traffic safety, children protection, fire prevention, Hazardous materials safety, school-violence prevention, urban planning & architecture, sexual violence and family violence's victim protection were being implemented.

Table 1. Current Legislation

Division		Institutional Method	Act	Contents
Life Safety Act	Traffic Safety	Children , Aged, Designation and Management of Protection Area for Aged and Disabled	Road Traffic Act	Protective areas for children, Protective areas for aged, To protect the aged or the disabled from the danger of traffic, he/she may take necessary measure, such as restricting or prohibiting the traffic of motor vehicles
		Life Road Area (Zone 30)	Road Traffic Act	Child safety zone, Aged safety zone, vehicle speed limit of disabled people safety zone, Traffic safety facilities
	Children Protection	Management of Protection Area Children	Child Welfare Act	Health Care, Hygiene, Waterworks, Safety, Environment, Traffic Convenience
		Establishment of School Environmental Sanitation and Cleanup Zone	Enforcement Decree of the School Health Act	Teenager' off limit zones in considering the clean zone for school environment,
	Fire Prevention	Designation of Fire Precaution Districts	Framework Act on Fire Services	Regulations like fire-fighting test and facilities targeting the areas prone for fire and possessing many dangerous facilities
	Hazardous Materials Safety	Maintenance and Management of Facilities for Dangerous Substances	Safety Control of Dangerous Substances Act	Dangerous article manufactory, Storing place, Agency, A surrounding in regard to safe distance
	School Violence Prevention	Integrated Control of CCTV Systems	Act on the Prevention and countermeasures Against Violence in Schools	Integrated control of CCTV systems for preventing any school violence.
	Urban Planning Architecture	Apply to Crime Prevention Through Environment Design(CPTED)	Urban Development Act	At establishing a urban development project's plan, the appropriate design of spatial environment like building arrangement, road shapes for preventing crimes
	Sexual Violence and Family Violence's Victim Protection	Designation of Victim Prevention Area	The National Police Agency Act	Collecting and managing the crimes statistical data, investigation data and crime records saved in the National Police Agency.

2.3 **Domestic and Foreign Similar Service and Functions Analysis**

Concerning the 3 representative service kinds of walk safety service, the traffic accident safety service and the crime services in order to establish a life safety information model, this study researched and analyzed domestic and foreign similar services and their functions as seen in Figure 2.

Among the domestic similar services, the Safety Dream Service can report to the report over the online and provides the text message reporting service, the face recognition system service, and 24-hours online counseling service. And the Smart Safe Home Return Service provides the safe home return and each district's information service, and life safe facilities information service. Metro Seoul's Our Village Safety Map Service is the Seoul Safety Portal Site's community map service, and in this community map service, residents well know to their own areas directly find out safe and dangerous factors in their towns and provide some convenient, safe life information to another residents living in the towns, and the safety and danger factors in each alley are classified as simple icons to be identified at once and are provided with their spot photos and map services.

For foreign similar services, the U.S.A provides the Crime Mapping Service selectively providing useful information by each crime type, and enables to change the information by designated date ranges, and also provides the danger notice and distant measuring service. Koshigaya-city, Saitama province in Japan manufactures the elementary children safety map as a part of making safe, securing village, and provides the map manuals for children and guides as well as some services for volunteers.

Fig 2. Domestic and Foreign Similar Service and Functions

2.4 Institution DB Analysis

In order to establish a life safety information model, it needed to review some spatial data, attributes data and such data-possessing institutions relevant to the life safety. In order to establish the life safety service DB, this study analyzed the relevant factors as seen in Table 2.

3. DEVELOPMENT OF LIFE-SAFETY SERVICE MODEL

In order to develop a life safety information service model, this study analyzed currently executing legislations, domestic and abroad similar services and functions, and concerned institutions' databases (DBs), and drew the 3 service goal model types (walk safety service, traffic accident safety service and crime safety service).

The walk safety service is the service model providing information on the way the walk or returning home targeting women, Aged and children, and the traffic accident safety service is the service model providing black spots information by class targeting children and Aged. Also, the crime safety service is the service model providing the security information about dangerous spots likely to happen crimes to women and children. Through these 3 life safety service models, this study drew 3 scenarios utilizing each safety service model.

Table 2. Institution DB

Services	Factor			Essential Particular	Agency in Possession
Traffic Accident Safety Service	Total	Traffic Accident Damage Information	The Number of Deaths, The Number of Injuries	Traffic Accident Current Situation Data	Road Traffic Authority, The National Statistical Office
	Total	Traffic Accident Occurrence Information	Area of Occurrence, Area of Frequent	Traffic Accident Current Situation Data	
	Total	Walk Safety Factor	Sidewalk, Road ,Street-Furniture	Walk Safety Factor	
	Children	Safety Information of Way of Commuting to and from School	Sidewalk of Commuting to and from School, Current State of Traffic Accident	School Nearby Vulnerable Place	
Walk Safety Service	Second-class Citizens : Children	School Life Safety Factor	Dangerous Place of School	School Nearby Dangerous Place	
	Second-class Citizens : Aged	Aged Life-Safety Factor	Sloping Road, Distribution of Aged Population	Dangerous Place of Aged (Slippery Road)	
Crime Safety Service	Total	Statistics of Crime Occurrence Area	The Number of Crimes by Region	Editing and analyzing the number of crimes by region according to the boundary of city and county.	KAIS (Korea Address Information System)
		Statistics of Crime Occurrence Place	The Number of Crimes by Place	Editing and analyzing the number of crimes by place according to the boundary of city and county.	
		Statistics of Crime Occurrence Time	The Number of Crimes by Time	Editing and analyzing the number of crimes by time according to the boundary of city and county.	
		Statistics of Crime Occurrence Day	The Number of Crimes by Day	Editing and analyzing the number of crimes by day according to the boundary of city and county.	
		Rape/Robbery Crime Occurrence Information	Rape / Robbery Crime Occurrence Background (hot-Spot)	Rape / Robbery Crime Occurrence Location	KAIS (Korea Address Information System)

3.1 Walk Safety Service System

Existing safe road relevant services divided the service targets according to small units of women, aged, children and disabled people, and provided relevant safety services in multi ways like mobile devices or web service. However, such existing services didn't provide the information drawn from accurate analysis, so it is judged that they lost the reliability and the accuracy on the provided information. So this study would construct a walk safety service system in order to more suitable information drawn from accurate analysis by each service target lass in future. For this goal, the utilized scenarios were seen in Figure 3.

The scenario for Walk safety service system selected its service target wanting to be provided the information about safe roads for socially disadvantaged people, and set the region, time and the space wanting to search, and enabled the targeting people to be provided accurate information.

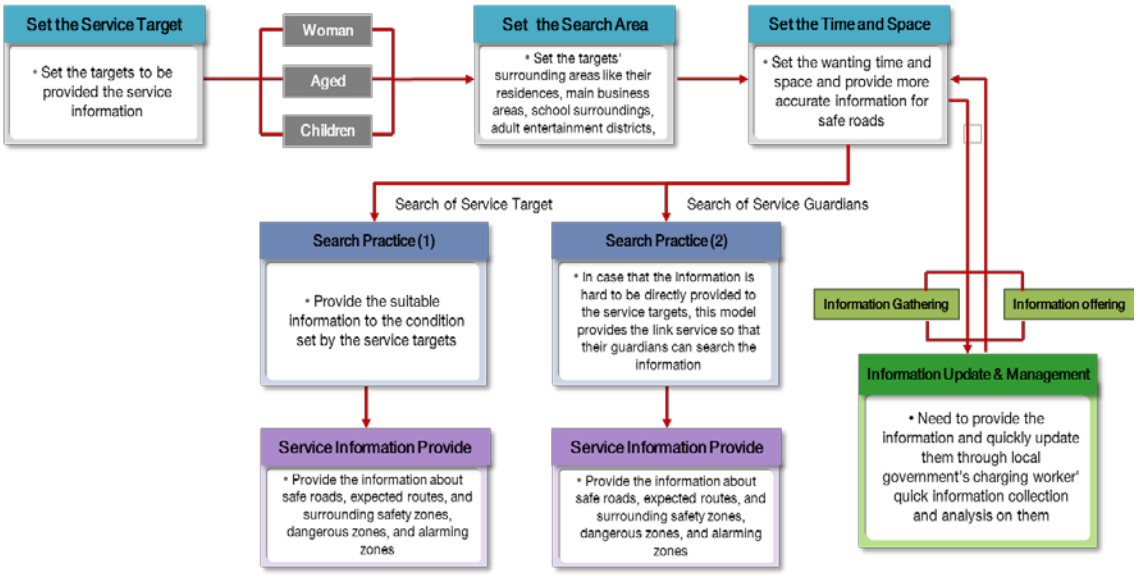

Fig 3. Scenario for Walk Safety Service System

3.2 Traffic Accident Safety Service System

The scenario utilizing the traffic accident safety service system selected its service target wanting to be provided the information about the traffic accident safety information for socially disadvantaged people, and set the region, time and the space wanting to search, and enabled the targeting people to be provided more accurate location information. Also, this scenario enabled the mutual compatibility and flexibility by dividing the search environments into both targets and their guardians so that they could directly provide or be provided the information.

3.3 Crime Safety Service System

As the results from analyzing the cases of existing domestic life safety services, it was found that they mainly provided the services informing the location information for life safety relevant to various crimes, disappearance, violence and children safety keeper. Besides, in terms of providing the information about crimes happening, their slow update cycle didn't deliver the real-time information

about the spot where a crime happened and didn't smoothly provide relevant information, so this study tried to establish a crime safety service system.

The scenario about crime safety service system set its service targets into women, under full 14-year-old children, and general people and selected the areas wanting to search. After having sett the search time and space in searching areas, this model enabled to provide more accurate information through the analysis on the district where a crime was likely to happen. Also, utilizing the information gotten through the residents' participation, this model enabled to assume a spot where a crime might be happened, or districts where crimes were likely to happened through reviewing statistical data about floating population and traffic volume.

4. CONCLUSION

This study conducted a research for the purpose of developing appropriate life safety information service models, and drew the following conclusion.

First, this study set the goal model range for life safety information service through its analysis on domestic and foreign status quo about life safety information, similar services and their functions and relevant, executing legislations.

Second, through the comprehensive analysis on existing life safety information, this study established the 3 service types of walk safety service, traffic accident safety service and crime safety service, and drew 3 scenarios utilizing these service types. The walk safety service was the service providing safe roads to the socially disadvantaged people, and the traffic accident safety service was the service providing traffic accident safety information and accurate location information to the socially disadvantaged people. And the crime safety service was the system accurately providing the information about districts where crimes were likely to happen to the socially disadvantaged people.

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Analysis on Differences of Impression of Landscape and Soundscape in Nagasaki CIty

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ABSTRACT: In this research, four survey points were set in Nagasaki City, and we analyzed the impression of landscape and soundscape, and compared the results of analyses by different evaluators. First, we performed the field survey and carried out directly the evaluation of landscape and soundscape in field by using the Semantic Differential Method. And, the local scenes and sounds were recorded by video camera. Next, the video images and sounds were evaluated by using SD method. And, the objects which formed landscape and the sounds which formed soundscape were analyzed by applying quantification theory and cluster analysis. Furthermore, the evaluation result in survey points was compared with the result of video images and sounds, and the effectiveness of the evaluation by using video camera was examined. Moreover, impression evaluation was performed by elderly persons using same video images and sounds, and we examined the difference in the impression evaluation by the different age groups.

1. INTRODUCTION

It seems that the person feels the scene of the place using all the five senses such as hearing, sense of smell, taste, the sense of touch as well as sight unconsciously. Therefore, we think that the scene of place can be expressed more richly by utilizing the information of landscape and soundscape synthetically.

Although the field survey of landscape and soundscape has been conducted for some areas, the number of evaluators is limited. In addition, it is feared that having a big effect on an evaluation result by the attribute of evaluators.

In this research, we compared the evaluation result of landscape and soundscape in field survey with that of video images and sounds, and examined the effectiveness of the evaluation using the video camera. Moreover, we examined the difference of the impression evaluation by the difference age groups.

2. METHOD

In this survey, four survey points were selected in Nagasaki City. The location of each survey point is shown in Fig. 1, and the outline of survey points is shown in Table 1. At first, we performed the field survey and carried out directly the evaluation of landscape and soundscape in field by using the SD method. And, the local scenes and sounds were recorded by video camera. Next, the video images and sounds were evaluated by several university students in twenties using same method. And, the objects which formed landscape and the sounds which formed soundscape were analyzed by applying quantification theory type 3 and cluster analysis. Furthermore, the evaluation result in survey points was compared with the result which was carried out with video images and sounds by students, and the effectiveness of the evaluation by using video camera was examined. Moreover, impression evaluation was performed by several elderly persons using same video images and sounds, and we examined the difference between the result of evaluation by several university students and the result by several elderly persons.

Qualification theory type 3 was applied to the impression data which was obtained by using SD method. Next, cluster analysis was applied to sample scores, and all the objects and sounds were classified into some groups. Furthermore, categorical scores were calculated by using qualification theory type3 and all categories were classified into some groups. In other words, adjective pair of “bad-good” was set as a standard item, and some groups to which each category of standard item belonged were prepared. Next, multi-dimensional Euclidean distances between categories of standard item and other categories were calculated, and all categories were collected into each group to which the distance was the shortest. Afterwards, the impression points were given to all categories, and the impression scores were calculated by aggregating total points of categories. Finally, we drew a histogram from impression scores, and set the impression ranks.

3. RESULTS

3.1 Comparison between the impression of field and that of video images and sounds

In this study, we collected 32 samples which formed landscape and soundscape in four survey points in Nagasaki City, we evaluated the impression qualitatively by using SD method, and we analyzed the impression of objects and sounds by applying qualification theory type 3.

At first, we calculated sample scores by applying qualification theory to the data obtained in survey points. The distribution of sample scores is shown in Fig.2. It shows that 32 samples are divided into five groups (form a to e).

Moreover, we calculated category scores, and we calculated the impression scores of all objects and sounds with category scores. Next, we drew the histogram of impression scores in survey points as shown in Fig.3, and set the impression ranks (form A to E). Table 2 shows the result of sample classification and the impression ranks in survey points. It is clear that the result of sample classification almost accords with the impression ranks.

The evaluation result in survey points was compared with the result which was carried out with video images and sounds by university students in twenties, and the effectiveness of the evaluation by using video camera was examined. As a result, it seems that the evaluation scores in survey points are slightly higher than that with video images and sounds (See Table 2). However, the impression of objects and sounds which have strong impact or natural images shows relatively high scores in both evaluation such as “Urakami church” and “nearby trees”. On the other hand, the impression scores of objects and sounds which have artificial images show relatively low such as “ factory” and “traffic sound”. Therefore, it is effective to use SD method with video images and sounds.

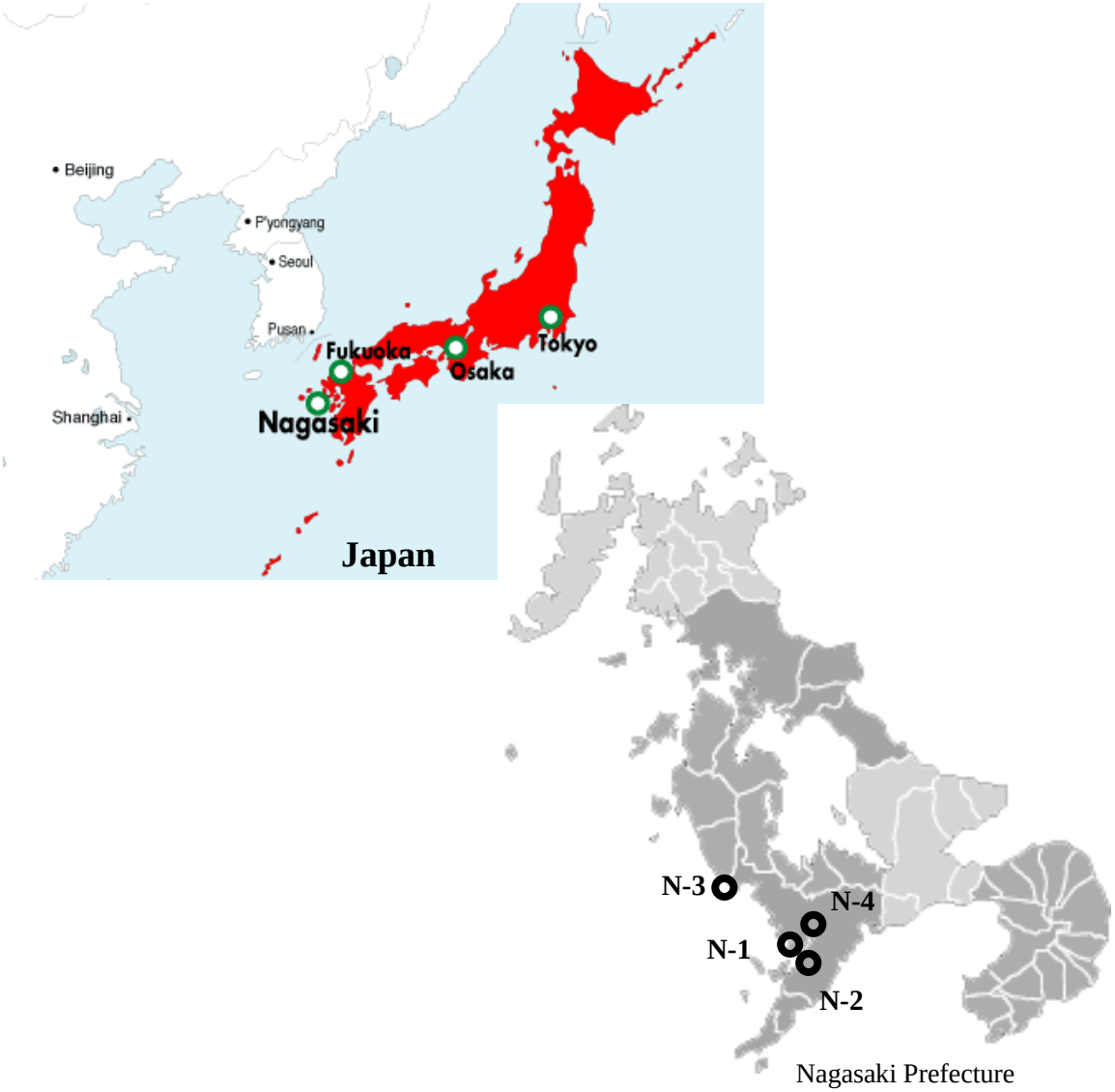

Fig.1 Location of survey points

Table 1 Outline of survey points

Point	Survey point
N-1	Tategami
N-2	Nagasaki Seaside Park
N-3	Sotome
N-4	Nagasaki Tensyu Park

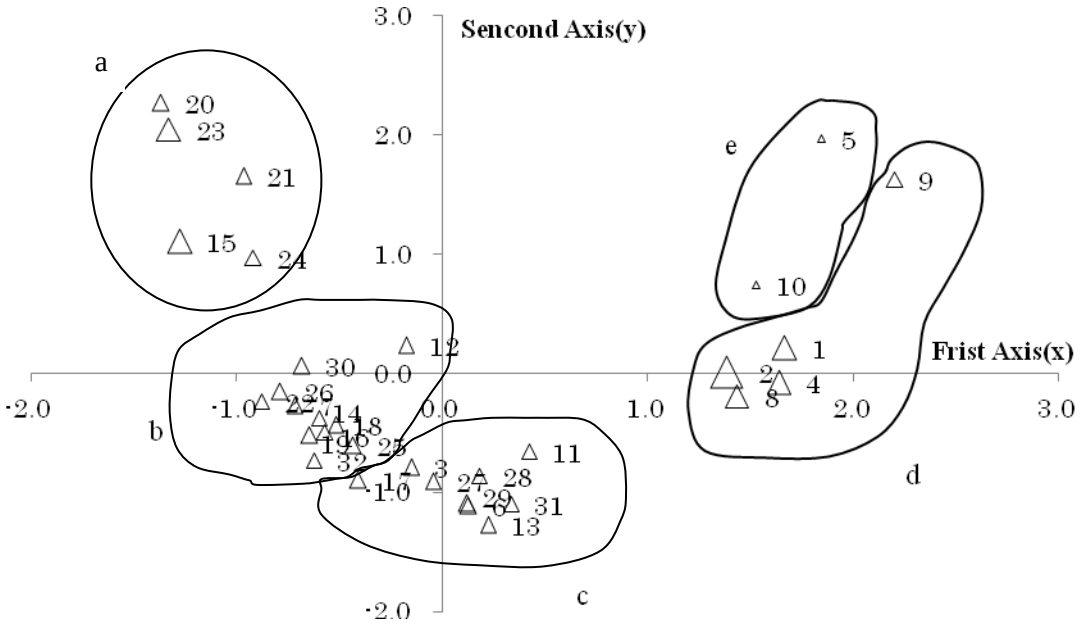

Fig.2 Distribution of whole samples

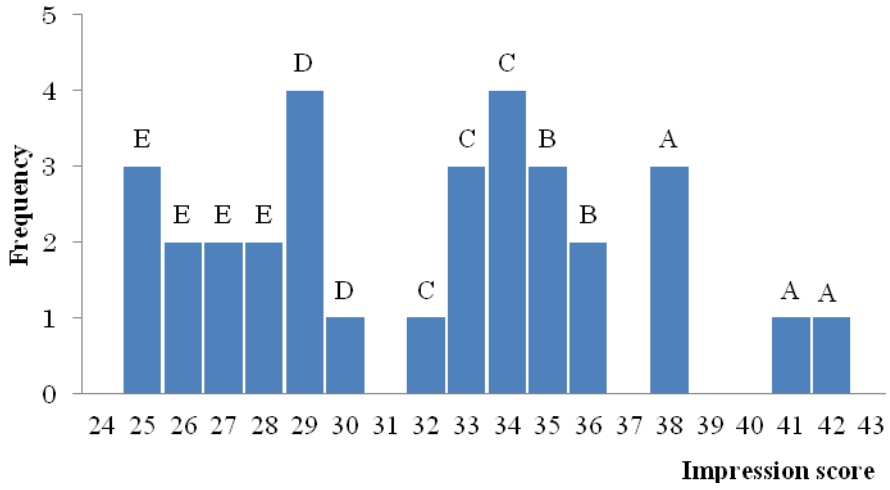

Fig.3 Histogram of impression scores

Table2 Score, Rank and Group of objects and sounds

Number	Sample	Classification	Field			Video(Young person)			Video(Elderly person)		
			Score	Rank	Group	Score	Rank	Group	Score	Rank	Group
20	Sea	object	42	A	a	35	A	b	35	A	c
23	Sound of wave	sound	41	A	a	31	C	b	30	C	d
15	Green of park	object	38	A	a	40	A	a	35	A	c
21	Beach	object	38	A	a	33	B	b	34	B	c
24	Urakami church	object	38	A	a	34	A	b	35	A	b
16	Jetfoil	object	36	B	b	31	C	b	34	B	c
26	Nearby trees	object	36	B	b	33	B	b	35	A	c
7	Mountain	object	35	B	b	23	D	c	35	A	c
25	Theological college	object	35	B	b	32	B	b	36	A	b
30	Sound of bell	sound	35	B	b	34	A	b	36	A	b
12	Goddess Ohashi	object	34	C	b	32	B	b	34	B	a
17	Koyoumaru	object	34	C	c	36	A	b	35	A	b
18	Steam whistle	sound	34	C	b	33	B	b	28	D	d
22	Slope (green)	object	34	C	b	33	B	b	33	B	c
14	Canal	object	33	C	b	32	B	b	32	B	c
19	Island	object	33	C	b	35	A	b	35	A	c
32	Children's voice	object	33	C	b	16	E	e	35	A	c
3	Container ship	object	32	C	c	21	D	c	30	C	d
28	Ground	object	30	D	c	27	C	c	33	B	c
6	Residence	object	29	D	c	24	D	c	28	D	d
13	The bridge ofcanal	object	29	D	c	36	A	b	28	D	d
27	Playground equipment	object	29	D	c	30	C	c	28	D	d
29	Toilet	object	29	D	c	30	C	c	30	C	d
11	Voice of cicada	sound	28	D	c	23	D	d	26	E	d
31	Beep	sound	28	D	c	28	C	c	29	C	d
2	JIB crane	object	27	E	d	23	D	d	29	C	d
5	Materials place	object	27	E	e	17	E	e	24	E	e
1	Gate type crane	object	26	E	d	22	D	d	28	D	d
9	Sound of works	sound	26	E	d	16	E	e	26	E	d
4	Dock	object	25	E	d	17	E	d	25	E	d
8	Factory	object	25	E	d	15	E	e	27	E	d
10	Traffic sound	sound	25	E	e	19	E	d	22	E	e

3.2 Comparison between the impression of young persons and that of elderly persons

The evaluation was performed by elderly persons with same video images and sounds as young persons in twenties. As a result, it is clear that the samples with high impression scores and the samples with low impression scores almost correspond in both evaluations (See Table 2). In other words, the impression of objects and sounds which have strong impact or natural images shows relatively high scores in both evaluations. On the other hand, the impression scores of objects and sounds which have artificial images show relatively low. However, it shows big difference among their evaluations as to "the bridge of canal", "mountain", and "children's voice".

4. CONCLUSION

The following contents were shown as a result of the analysis.

a) The result of classification using sample scores of objects and sounds almost accorded with the result using categorical scores in three cases which was the direct evaluation in survey points, evaluation by young persons with video images and sounds, and evaluation by elderly persons. Therefore, it shows that the evaluation results of these three cases are effective.

b) The evaluation result in survey points was compared with the result which was carried out with video images and sounds. As a result, it seems that the evaluation scores in survey points are slightly

higher than that with video images and sounds. However, the impression of objects and sounds which have strong impact or natural images shows relatively high scores in both evaluation. On the other hand, the impression scores of objects and sounds which have artificial images show relatively low. Therefore, it is effective to use SD method with video images and sounds.

c) The evaluation was performed by elderly persons with same video images and sounds as young persons in twenties. As a result, it is clear that the samples with high impression scores and the samples with low impression scores almost correspond in both evaluations. In other words, the impression of objects and sounds which have strong impact or natural images shows relatively high scores in both evaluations. On the other hand, the impression scores of objects and sounds which have artificial images show relatively low.

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A Study on Reverse Engineering of Bobsleigh Structure Using Terrestrial LiDAR

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ABSTRACT: Recent extreme weather events and natural disasters are causing rapid aging of the ancient structures with cultural value. It has threatened the safety and management. The construction design documents are not kept for such long time. Even if they are, they seem to be mismatched with the design structures due to corrosive effects. For these reasons, Korea has been facing difficulties in maintenance, reengineering and safety evaluation. The purpose of the study is to derive the drawings of the existing structure and compare with original. The reverse engineering is done by extracting 3D cloud point data from terrestrial LiDAR system.

1. INTRODUCTION

Recent extreme weather events and natural disasters are causing rapid aging of the ancient structures. Even recent urban structures are undergoing rapid corrosive effect due to causes like acid rain etc. With time, these structures are in need of maintenance and safety e. But, the original design documentation are not available, even if they are, the structure seems to have changed. Hence, for the maintenance or safety evaluation, the reverse engineering should be performed. It is now increasingly popular technique used in different fields.

Reverse Engineering is the process of discovering information about an object in order to know its technological principles or current status. It can be obtained through total station, 3D laser scanners (LiDAR) and photogrammetric techniques. It is applies in design of small mechanical parts to machine works in heavy industries. It is also used in reconstruction of new software's in computer science. But its use is limits to safety assessment of structures like bridges and tunnel, in civil engineering. Hence, the study focuses on application of reverse engineering.

The purpose of this study is to derive information of the existing structure and compare with original design plans. The reverse engineering is done by extracting 3D cloud point data from terrestrial LiDAR system.

2. THEORY

(1) LiDAR

LiDAR is a remote sensing technology that measures distance by illuminating a target with a laser and analyzing the reflected light. It is popularly used as a technology used to make high resolution maps, with applications in geomatics, archaeology, geography, geology, geomorphology, seismology, forestry, remote sensing, atmospheric physics, and airborne laser swath mapping (ALSM), laser altimetry, and contour mapping.

A Ground based LiDAR works on the principle of laser triangulation & time of flight. Triangulation implies between the scanner lens, laser, and object being scanned to obtain accurate 3D data as point cloud. The distance between the scanner lens and laser (parallax base) is known and to find the time of flight/distance (ρ) between the scanner and the object is by using speed of light (c) and the travel time (Δt) (Norbert Pfeifer, Christian Briese, 2007).

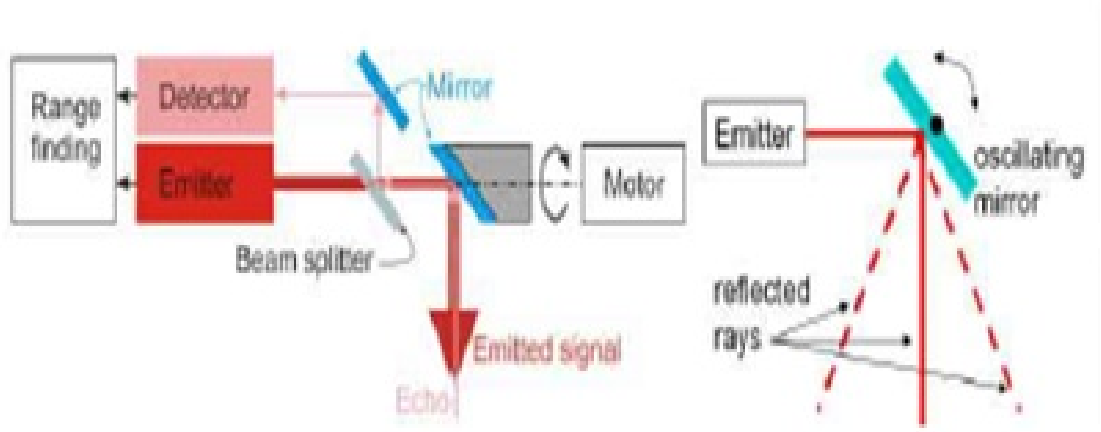

Figure 1. LIDAR's principle (Norbert Pfeifer, Christian Briese, 2007)

In triangulating laser scanner, the laser energy is widened in order to form a plane, rather than a beam. With the help of a rotating mirror, this plane is swept through object space. All information is provided to obtain x, y, z coordinates of the objects surface. A dense point cloud is then produced through associated software like Cyclone.

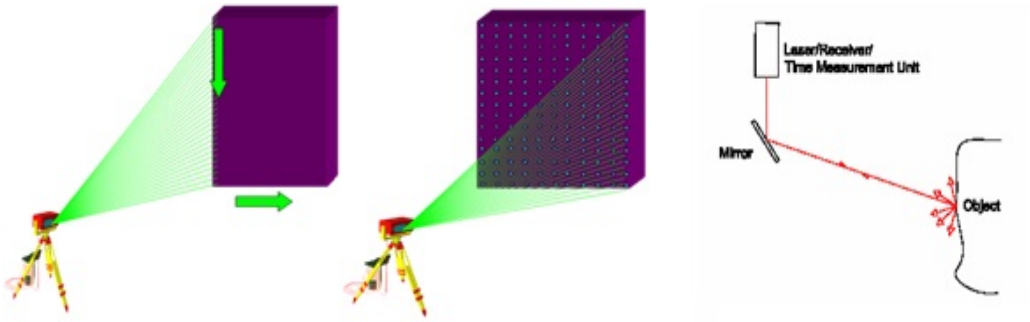

Figure 2. Basic Principle of LiDAR (leica-geosystems.in, October-2012)

(2) Reverse Engineering?

Reverse Engineering is Engineering is a concept of engineering in which the produced object is detail studied of its construction and composition. It is also referred retro-engineering or reverse-analysis. It somehow contracts the main principle of the engineering concept in dissembling as primary step. It can be obtained from various processes, but the basic approach is to recreate the 3D model and make measurements over it.

Reverse Engineering takes widely advantageous in the field like Cultural Heritage Conservation, the motor industry, aviation industry, medical device, game, animation industry.

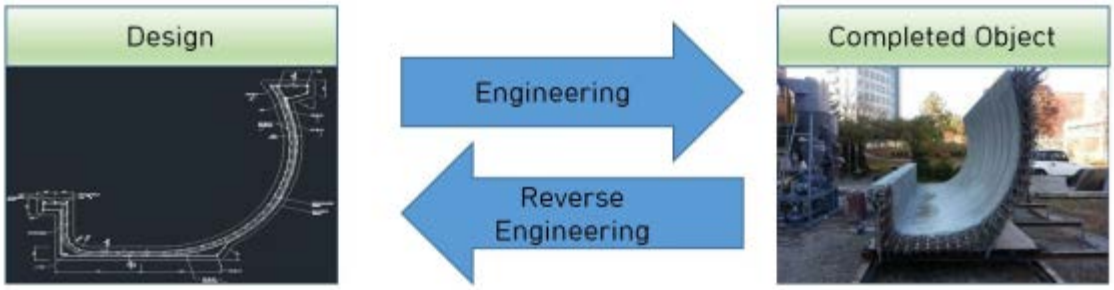

Figure 3. Reverse Engineering

3. METHODOLOGY

The basic principle is to derive the complete 3D model through laser scanning of the object and different measurement will be carried to create the construction plans and drawings. The process can be summed up in following topics:

STEP 1. Object selection

STEP 2. Control point selection for LiDAR and target

STEP 3. Monumentation

STEP 4. GPS control point survey

STEP 5. LiDAR scanning

STEP 6. Export cloud point to AutoCAD for reverse-engineering

Figure 4. Processing

4. SCANNING AND ANALYSIS

4.1 Scanning

The main field work for the reverse engineering is to obtain 3D scan using LiDAR.

4.2 LiDAR scanning objects And Processing

The study object: bobsleigh track, was recently constructed by Civil Engineering Structure Lab of Kangwon national university. Its dimension is 6m x 2m x 2m. It was constructed with shotcrete and was completed on July, 2013.

Figure 5. Bobsleigh Structure

4.3 LiDAR scanning and GPS Survey

For the study, Topcon's GLS-1500 model LiDAR and GRX2 model GPS were used (Fig 6). The software for processing LiDAR image was ScanMaster, whereas for the drawing and comparison AutoCAD was used.

Figure 6. GLS-1500(LiDAR) and GPS

Before beginning the scan, it is very important to find suitable control points for LiDAR and target itself. It should be chosen in such a way, two scan can be tied with target and the combination of all scan will cover the structure from all dimension without obstacles. It is recommended that, the number of target must be at least 3 in number with min two in one scan.

Figure 7. Layout of the scan and target control point around bobsleigh block.

LiDAR uses its relative coordinate system while obtaining of the position of the points in object. It is essential to either provide absolute coordinate system or transform the cloud point to it. The GPS used in the measurement of the coordinate is recorded in Transverse Mercator (TM) system. The coordinates of the target points are as follow:

Table 1. Coordinates of the target

Point	X	Y	Z
Target-1	585784.452	265083.550	108.000
Target-2	585779.487	265058.405	108.022
Target-3	585772.127	265065.617	108.043

4.4 Data processing and analysis

The scan resolution was 5mm x 5mm which has result in large amount of cloud data. First of all the cloud data were thinned through filtering for the processing and cleaned for the required structure only. The scans were registered according to the common targets. The RGB scans are shown in the following figures, where color represents the reflected intensity.

4.5 Reverse Engineering using AutoCAD

Most of the work form scanning to 3D cloud point filtering, registration and 3D model generation is done in Topcon ScanMaster software. The 3D structure was exported to AutoCAD in different views, front, back and cross section.

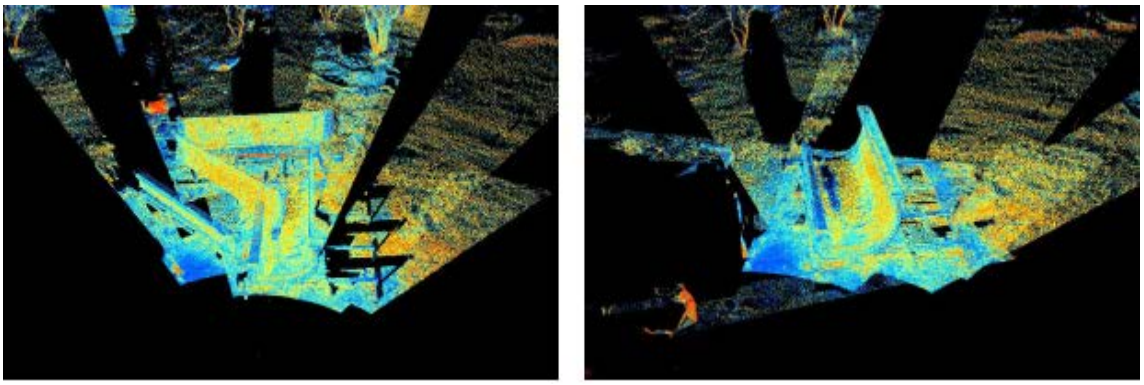

Figure 8. Registration

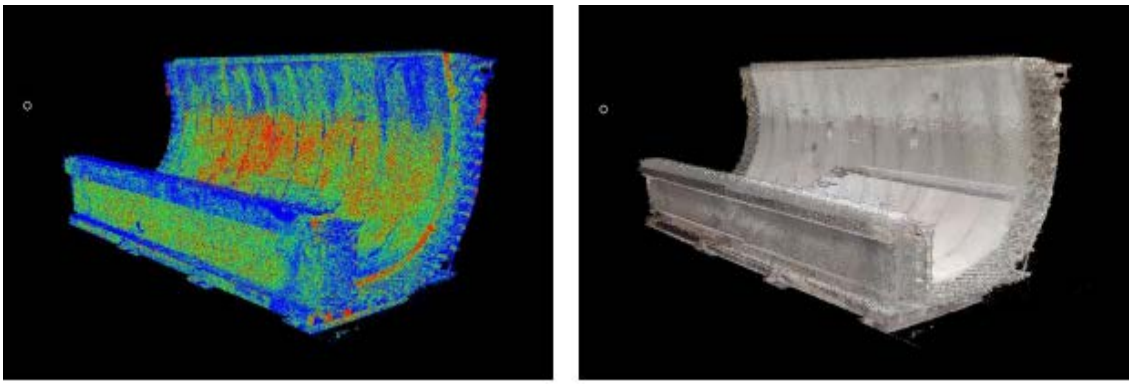

Figure 9. Complete data

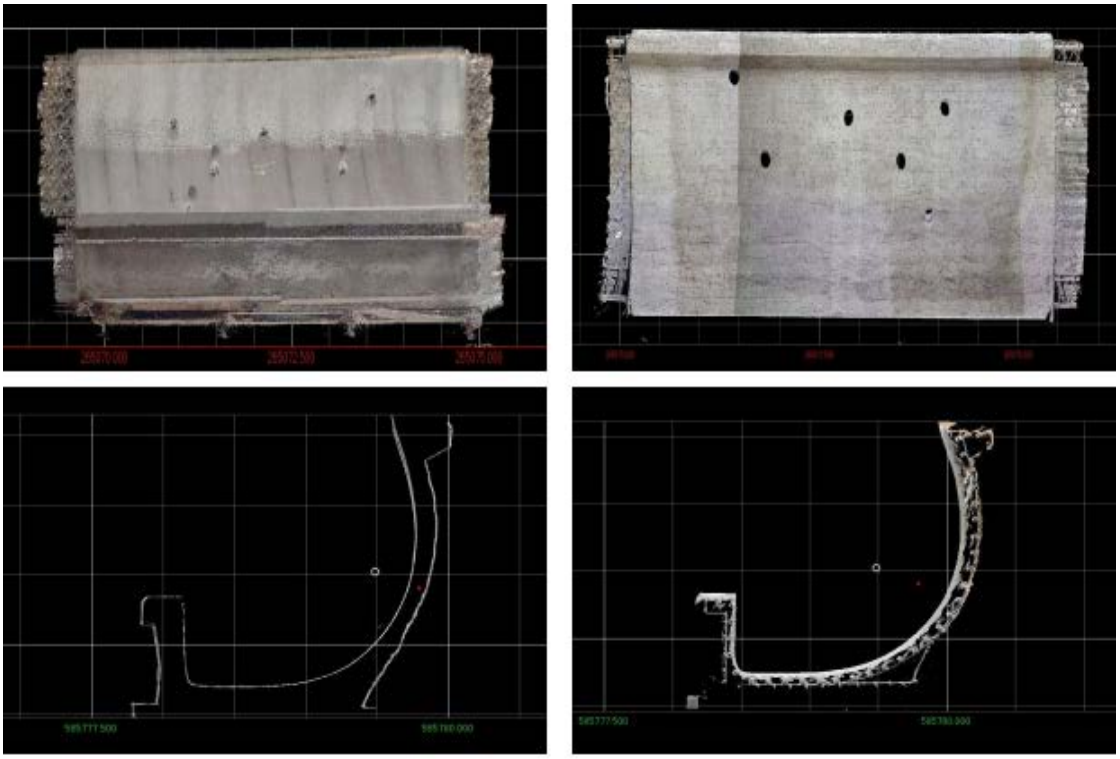

Figure 10. Front view, back view, cross section

In the following figures, left images show the images simple exported image whereas the right one is viewed in different views in AutoCAD. Export views from ScanMaster to AutoCAD.

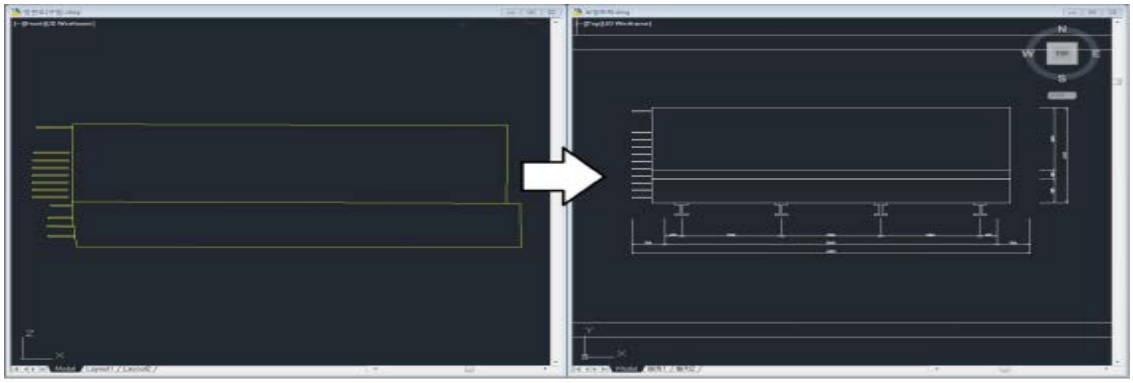

Figure 11. Insert measurement of Front view

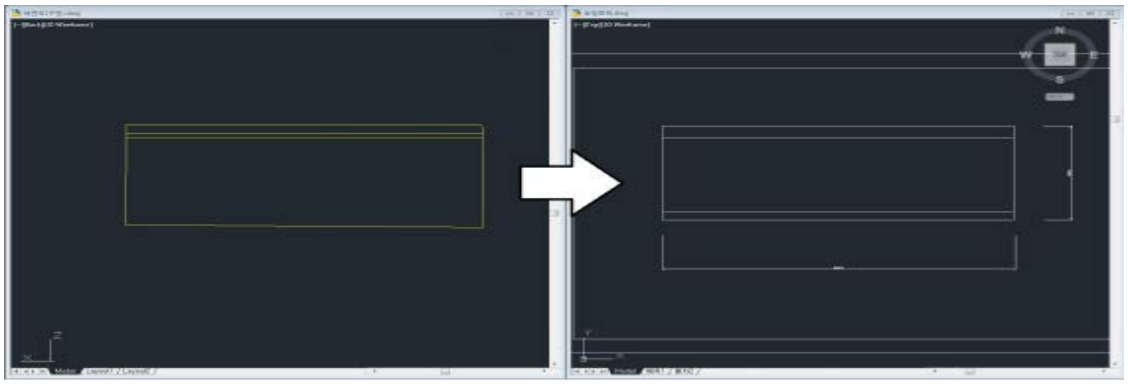

Figure 12. Insert measurement back view

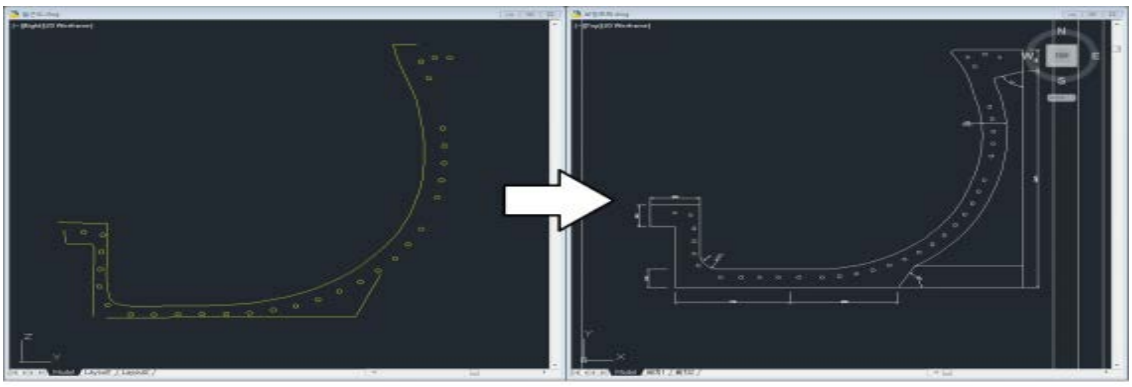

Figure 13. Insert measurement cross section

4.6 Comparison

The structure of bobsleigh was based on the original track design guidelines of FIBT. The drawings were used to compare with the reverse engineered outputs. The comparisons were done on AutoCAD in different view.

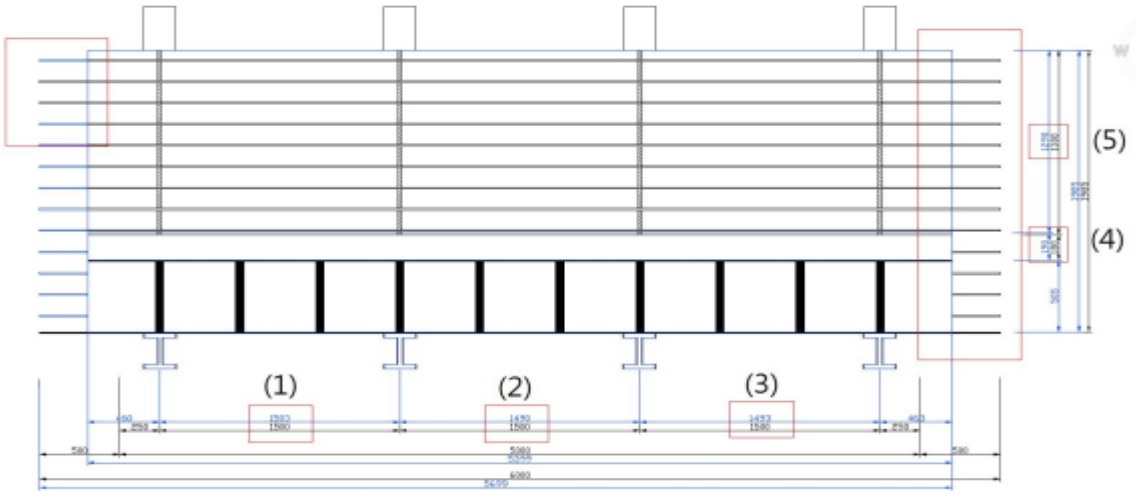

Figure 14. Compare with the reverse engineered outputs (Front view)

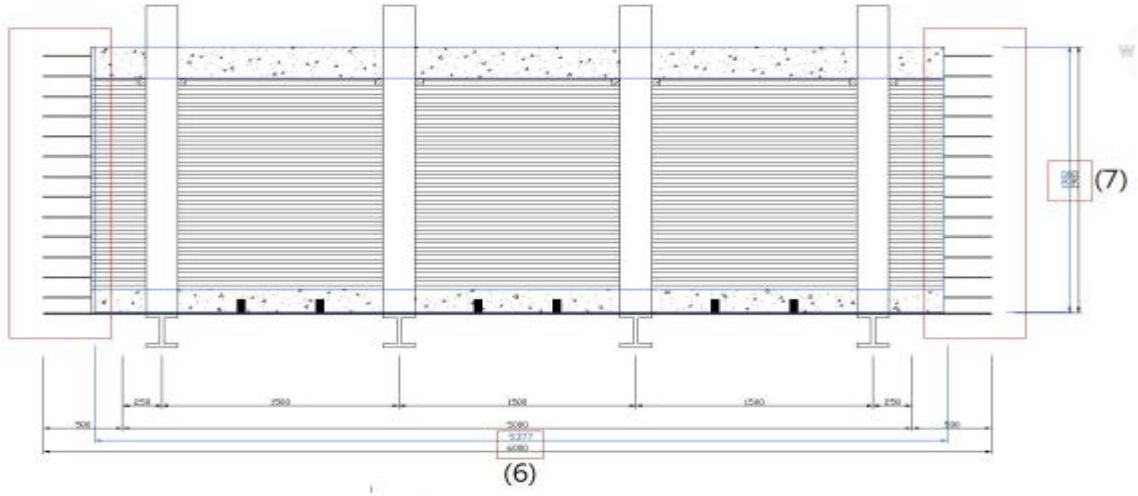

Figure 15. Compare with the reverse engineered outputs (Back view)

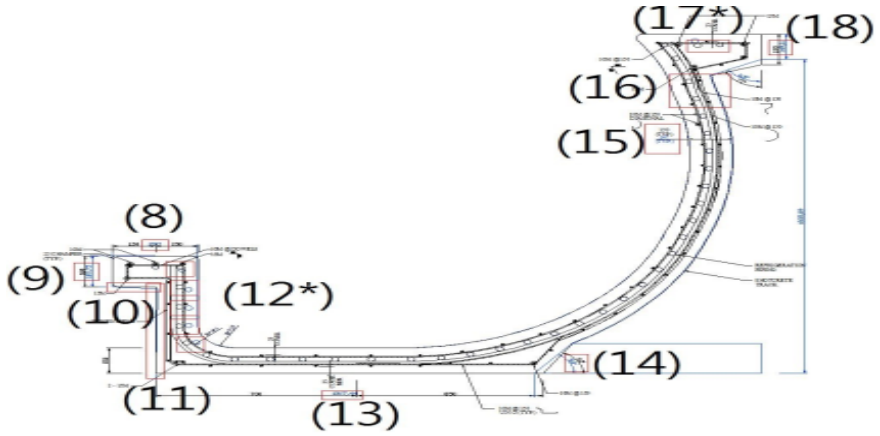

Figure 16. Compare with the reverse engineered outputs (Cross-section)

First of all, the corners were matched for the matching of the two different sources. In the above figure, random points were selected across the outline of the structure, which can be seen as numbers in brackets. Front, back and cross-section view were sampled at 5, 2 and 11 points respectively. In the front view, the error was found to be -0.023 to -3.003m. In back view, error ranged from -0,023m to +0.003m. Similarly, the cross section has error ranged from 0m to + 0.033m. The total RMSE is ±0.018753m. The detail of the displacement error can be seen in following table 2.

Table 2. Comparison analysis

No	Original data(m)	LiDAR data(m)	Error(m)	
(1)	1.500	1.503	+0.003	Front view
(2)	1.500	1.490	-0.010	Front view
(3)	1.500	1.493	-0.007	Front view
(4)	0.180	0.190	+0.010	Front view
(5)	1.300	1.290	-0.010	Front view
(6)	5.400	5.377	-0.023	Back view
(7)	1.985	1.982	-0.003	Back view
(8)	0.300	0.297	-0.003	Cross-section
(9)	0.180	0.184	+0.004	Cross-section
(10)	0.125	0.158	+0.033	Cross-section
(11)	0.505	0.495	-0.010	Cross-section
(12)	0	0.031	+0.031	Cross-section
(13)	1.350	1.317	-0.033	Cross-section
(14)	0.202	0.221	+0.019	Cross-section
(15)	0.150	0.147	-0.003	Cross-section
(16)	0	0	0	Cross-section
(17)	0	0.030	+0.030	Cross-section
(18)	0.180	0.150	-0.030	Cross-section
The mean error			0.01456	
RMSE			0.018753	

5. CONCLUSION

The purpose of the study is to derive the drawings of the existing structure and compare with original. The reverse engineering is done by extracting 3D cloud point data from terrestrial LiDAR system.

After comparing the reversed engineered structure and original design drawing, the displacement has been found from 1mm to 33mm in different from lack and lateral view. The RMSE was found to be ±0.018753m. These error might be result of error while control point establishment and error due to construction. From the study, it can be concluded that, LiDAR can be used for effective reverse engineering tool which takes very short period of time.

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Education Philosophy and Faith of Father Marc Marie de Rotz

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ABSTRACT: In Japan, there is a history of severe Christian suppression over two hundred and seventy years in Japan. In the Meiji era, Christian ban was temporarily stopped. At the same time it should be called the re-starting of the Christian people. At that time, there was a French priest living with them in lifelong. His name is Marc Marie de Rotz. He left the performance of many inheritances. Fields covered printing and publishing business, church construction, land clearing, welfare and its medical activities. Why does he have been allowed so much activity in the small village that has been derided poor of Japan? This paper is an object of the present invention that the results from the Father De Rotz, discussed issues associated with education philosophy.

1. FATHER DE ROTZ

Father Marc Marie de Rotz was born as the second son in March 26, 1840[1)], called the House of Provo in the Calvados, France. He is a member of noble family of Normandy. He was born with a large fortune in his family. He ordained priest at the age of 25. After that, he becomes assistant priest of the St. Julien Church, as a member of the welfare and hospitals. The following year, he joined the Paris Foreign Mission Fellowship in April 19, 1868. Along with the Father Puchijan, they come to Japan from France by ship France named Peluse[2)].

2. MISSION OF FATHER DE ROTZ

Father De Rotz was appointed to Sotome Town of Japan in 1879. He worked on the publishing business in the early period. Chinese character limit theory was found in this work[3)]. It is intended that everyone could read and understand easily. If there would be Chinese character in text, the people of former days could not understand the Chinese character.

In 1879, Father De Rotz opened one private school for catholic order[4)], in addition to reading and writing, mathematics to use on a daily basis are listed in the learning content. It is supposed to teach the basics of order to be able engaged in the life that they did well with the future focused.

He worked on the medical activity when dysentery was prevalent in Urakami Town[5)]. He traveled back and forth on a daily between Urakami and Oura Catholic Church. The distance is eight kilometers one way. Mortality rate of dysentery at the time was of 30-40% average. However, as a result of his activities, the death rate in the Urakami Town was reduced to 4%. This was not only Father De Rotz's achievement, but his co-workers in Urakami Town. Young men and women who include Mrs. Iwanaga Maki was cooperation.

Relating to Father De Rotz and his time, Sotome Town people were engaged in farming and fishing in their work. Father De Rotz taught them how to squid fishing and sardine fishing with reference to the situation of fish movement and change of tide[6)].

He also made a sardine factory network in 1886. Women were working field of mainly in there. So that time, he made a nursery to able to work in peace, avoiding a lot of trouble about children[7)]. At first kindergarten was established in 1876 in Tokyo, Japan named Tokyo Women's Normal

Kindergarten. However, this was for the children wealthy. A nursery for poor children, is the first to have been founded by missionary R · Thomson Baptist at Kobe in 1895[8]. It is means that nursery of Father De Rotz was the first example in Japan.

One episode on education has been left between Father De Rotz and a boy Mr. Sakamoto Sentaro. “Sentaro, human being who has not academic knowledge, it is very difficult to grow as an excellent human being. You could not be able to go to school. However, you can study without going to school. I want to teach you; however, we have no time expect eating time. So I'll teach you in meals. I cannot afford to various academic. So I will teach the most important philosophy for human beings to you"[9]

Father De Rotz believed that the study of philosophy for human being is very essential. Author fined a common point from this episode. It is it “To do when it is necessary” He had known what the town peoples whether they need or not. This word "Father De Rotz`s medicine is quite effective"[10] is reported to the Sotome people still now. This word is something about Father De Rotz`s activities.

3. DISCUSSION

Through the mission of Father Marc Marie De Rotz, he is truly the salt and the light of the world very much[11].

He had achievement in various fields as a printing, publishing business, civil works, welfare, and also medical relief work, in which he worked on educational activities in addition to his ministry farther. How he could make the achievements of so much. He devoted as a catholic, his life to the town people of Sotome Nagasaki without return back to his home, France. Father De Rotz was called affectionately as "Doro-sama" from Christian, Nagasaki. It means that father De Rotz has life giving spirit. And that is because he has a definite "faith".

Noteworthy feature of Father De Rotz would be the practice of "love one another". Jesus says to his disciples "To love one another, just as Ihave love you"[12] Father De Rotz loved people of Sotome Town even while devoting his life. Father De Rotz did not his life personally, but lived in all of Christian. He also made nursery, which is said to "Come bring to me the children. Kingdom of heaven is one of those who like this."[13] This nursery is also the first example in Japan. The root of his ideas can be taken from the Bible and try to apply this at Sotome town. Father De Rotz is understood that it was due to the action plan from the Bible. It said that his life is not only preach the Bible, but also doing something for the people with a behavior. He also had a valuable education work. He was thinking human beings need for human dignity. And he was thinking that everyone should learn equally. Consequently, he teaches us "To do when it is necessary" .This is the educational philosophy of Father De Rotz. Educational activities of Father De Rotz teach us his educational philosophy. In Japan conflicts of Education society has also occurred in the other hand. Learning assessments across the country are rated.

4. CONCLUSION

Bible said “I tell you solemn truth, unless a kernel of wheat falls into the ground and dies, it remains by itself alone. But if it is dies, it produces much grain.”[14] “For even the Son of Man came not to be served but to serve others and to give his life as a ransom for many.”[15] Father De Rotz serve the people of Sotome, there are grain of wheat that Father De Rotz left a crop of great love. Love of "Doro-sama" has been handed down in the land of Sotome still now.

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6) Yakichi Kataoka, Welfare image of Meiji era, NHK, 1977,p.161
7) Reiko Mori, Father Do Rotz's Adventures, Kyobunsha, 2000,p.123
8) Ibid, p139
9) Ibid, p.117
10) Yakichi Kataoka, Welfare image of Meiji era, NHK, 1977,pp.163-166
11) New Testament with Psalm, Japan Bible Society, 2004,p.6
12) Ibid, p.196
13) Ibid, p.144
14) New Testament with Psalm, Japan Bible Society, 2004, p.192
15) Ibid, p83

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A Study on Liability of Contract between Ocean Freight Forwarder and Client

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ABSTRACT: According to the laws and the judgment, the legal nature of the contract which is made between ocean freight forwarder and client, is different by the contents of the contract and performances. What kind of contract is made? How to distinguish those differences? Why a freight forwarder needs to undertake to forward goods through carriers in his own name according to the Civil Law? This paper found the contracts made between ocean freight forwarder and client mainly include the contract of freight forwarder, the Contract of Carriage, and the Contract of Mandate. The liability of mandate is stricter than the liability under the contract of ocean freight forwarder. The "with his own name" shall be decided from the practice. And, by the practice, the "with his own name" rule is not needed.

Keywords: the Ocean Freight Forwarder, the Contract of Freight Forwarder, the Contract of Carriage, the Contract of Mandate

1. INTRODUCTION

From the number of licenses and operating companies of freight forwarder in our country, we can see that the number of the elimination of companies is relatively high. According to the International Ocean Freight Forwarders & Logistics Association, Taiwan (IOFFLAT), there were 1350 licenses being issued until March, 2010, but the members of the association were less than 650. Almost half of the companies were no longer operating. It is a very special situation in this industry. The causes are as follows: (a) It's very easy to start this business, many young people get into it without thorough thinking. (b) Most of the companies only provided the service of NVOCC from port to port because of the restriction of laws and authorities. (c) The work requires many labors. (d) There are too many companies whose scale and quality are uneven and most of them lower the price to earn the clients. (e) It's becoming risky to run this business because more and more clients don't pay the freight fee. [1]The freight forwarder is a person between the owner and carrier and he has to deal with lots of work for owner. Because of the expending services, the way of carrying and combining transport, freight forwarder has to face more complicated liability and risk.

Freight forwarder accepts the commission from owner to forward goods through carriers and serve other related affairs for owner. Except freight forwarder who has himself delivered to the shipper a bill of lading, or has himself transported the cargos, or a fixed price for the whole of the

[1]Chun-Peng Tzeng, Ling-Ju Liao [2010]. *The Ocean Forwarder Practice* [pp.37]. [1st ed.]. Taipei: Wu Nan

transportation has been agreed upon should bear the liability of carriers, freight forwarder should only bear the liability of freight forwarder that occurs because of the contract of freight forwarder which was signed by freight forwarder and owner. However, according to *number 3 verdict year 2011, Kaohsiung Branch, Taiwan High Court,* judge considered that freight forwarder didn't forward goods through carriers in his own name, so the contract which freight forwarder and owner signed was the contract of mandate. It's different from the preceding statement. What type of the contract which freight forwarder and owner signed is made? How to distinguish their differences? What is the liability different from different contracts? Why is it different that freight forwarder forward goods "with his own name" or not? Therefore, in this paper, we are going to discuss this problem by analyzing the definition of freight forwarder, their works and their liability and contract between him and owner.

2. THESIS

2.1 THE DEFINITION OF OCEAN FREIGHT FORWARDER

2.1.1 THE DEFINITION OF OCEAN FREIGHT FORWARDER IN CIVIL CODE

In *Civil Code Article 660 Paragraph 1* "A freight forwarder is a person, who undertakes, as a business, to forward goods through carriers in his own name but on account of other persons, for remuneration."Freight forwarder must run this business by forwarding goods. If someone occasionally forwards goods for client, their relation is mandate not freight forward.[2] The essence of freight forwarder is to forward goods through carrier and have a contract of carriage with carrier and that's why it is separated out of commission agency.

Besides, in *Civil Code Article 663* "Unless otherwise provided for by contract, the freight forwarder may himself assume the transportation of the goods, in which case he has the same rights and obligations as a carrier.", it means that freight forwarder has intervening act in transportation and assumes as a carrier. In *Civil Code Article 664* "If a fixed price for the whole of the transportation has been agreed upon, or if the freight forwarder has himself delivered to the shipper a bill of lading, the freight forwarder is deemed to have himself assumed the transportation of the goods, in which case he is not entitled to remuneration". There are two situations in this Article as follows: first, two parties agree on a price for transport, second, freight forwarder has himself delivered to the shipper a bill of lading. Freight forwarder is deemed as a carrier in both of situations.[3]

2.1.2 THE DEFINITION OF OCEAN FREIGHT FORWARDER IN SHIPPING ACT

In *Shipping Act Article 3 Paragraph 4* " "Freight Forwarder" means the organization engaging in soliciting cargoes in its own name for carriers to transport, wherefrom it receives remuneration.", we can see that the meaning of freight forwarder whether in Shipping Act or in Civil Code is the same. In *Shipping Act Article 41*"Except the freight forwarder that is operated by a vessel carrier, no freight forwarder shall bareboat charter vessels to transport the cargoes it solicits", freight forwarder could not be a real carrier who ships goods by ship. However, it is not being regulated in Shipping Act that freight forwarder couldn't be deemed as a carrier in two situations which I mentioned in 2.1.

Besides, Chun-Peng Tzeng once mentioned in his book that freight forwarder only has one function which is "to forward goods through carrier for remuneration". From the explanation of surface meaning f by Ministry of Finance, it eliminates freight forwarder being a representative owner to apply to the customs for goods or being a carrier to send manifests to Customs. Some transactions of what forwarder doing are not validated, it has no enough laws to be

[2]Tsung-Chih Chiou [2002]. *New Claims Act(Part II)* [pp.567] [1st ed.]. Taipei: Angle.
[3]Li Huang[2002]. *Civil Law: Kinds of Obligations(Part II)* [pp.382-383][1st ed.]. Taipei: Angle.

proved. IOFFLAT had suggested to modify the definition of freight forwarder to "freight forwarder accept the mandate from owner, to arrange the affairs related to transport on his or owner's own name". However, it was not adopted when Shipping Act was being modified.[4]

2.2 THE PRACTICAL TASKS OF OCEAN FREIGHT FORWARDER

Freight forwarder is a mandatory who fulfills the tasks owner requested. According to "Freight forwarder Theory and Practice" written by Chun-Peng Tzeng and etc, we can divide the services of freight forwarder into five categories as follows:[5]

(a) The Consulting Service before goods on boat such as inquiring about sailing schedule, the cost of freight and the related laws of foreign country.
(b) The Arrangement of Transport from factory to the harbor of export including inland transport, warehousing, and etc.
(c) Service about the port of discharge including devanning, import declaration, warehousing, to deliver the goods to the place owner assigned.
(d) Other Services owner requested as follows:
    i. Supplying containers and to arrange the insurance of goods, warehouse, and transport.
    ii. To prepay the charges on owner's behalf, the general situation is to prepay overseas customs duties.
    iii. The service of special cargoes.
    iv. The service of cargo packing.
    v. The transit service.
    vi. The service of exhibition or exposition.
    vii. The transit service of package plant export
    viii. The notification service of the related goods.

Besides, in the paper written by Shin-ping Chang, also has an understanding of the practical operating of freight forwarder. In the practical operating of freight forwarder, forwarder receives the cargoes from shipper and transfers all of them to carrier to ship export or turn over the cargoes that carrier carries import to owner. Freight forwarder is representative of owner, not shipping agency, although forwarder has to deal with the related tasks between carrier and shipper. It's always being written on the bill of lading, "You couldn't be deemed to pay to the carrier and have to undertake the risk when you paying the freight fee and other charges to freight forwarder, broker, or the person who is not the representative of carrier". It means that you have to pay the freight fee to the carrier or his representative, not the agent of owner. In the practical of shipping, the large enterprise who has more cargoes to be exported could be a shipper to negotiate price with shipping company directly; small and medium-size enterprises always require the service of consolidation because of less cargoes to be shipped, they mostly entrust their cargoes to freight forwarder to deliver. Because of the number of cargoes, shipping company always serves large enterprises and freight forwarder serves smaller size enterprises.[6]

Furthermore, in *Civil Code Article 661* "The freight forwarder is liable for any loss, damage or delay in the delivery of the goods entrusted to him, except he can prove that he has not failed to exercise due care in the reception and custody of the goods, in the selection of the carrier, in the delivery at the destination and in all other matters connected with the transportation." The reception means forwarder receives the cargoes of delivery from client; the custody means he has to take care

[4]Chun-Peng Tzeng, Ling-Ju Liao [2010]. *The Ocean Forwarder Practice* [pp.8][1st ed.].Taipei: Wu Nan.
[5]Chun-Peng Tzeng, Ling-Ju Liao [2010]. *The Ocean Forwarder Practice* [pp. 7-8] [1st ed.].Taipei: Wu Nan.
[6]Shin-ping Chang [2010]. The Liability of Freight Forwarder- The comments of number 31 verdict year 2009, Taiwan High Court. *The Law Monthly.* 61[3], 65.

of the goods from receiving it to transferring it to carrier; the selection of the carrier means forwarder has to choose the carrier who can be trusted and sign the contract with him; the delivery at the destination means forwarder gets the goods from carrier in destination and transferring the goods to consignee; [7] all other matters connected with the transportation. For instance, when client has other commitment after transferring the goods to carrier, forwarder should ask carrier to do it immediately, [8] or to transfer the goods, etc. [9]

Some scholars think that the duty of forwarder is not to carry goods, but to arrange it. In Civil Code Article 660, we can know that the main works of forwarder is to forward goods through carriers and it doesn't involve providing a good quality of conveyance because that is the job of carriers. [10]

In this study, we had visited the freight forwarder and they told us that they usually book the space with their own name. If the client needs the bill of lading, they will tell the shipping company that the shipper section of bill of lading needs to add client's name.

2.3 THE CONTRACT BETWEEN OCEAN FREIGHT FORWARDER AND OWNER

Due to the different services which forwarder provides, there should have different kinds of contract between freight forwarder and owner. We can know that freight forwarder should exercise caring in the reception and custody of the goods, in the selection of the carrier, in the delivery at the destination and in all other matters connected with the transportation in Civil Code Article 661. Therefore, we will consider the kind of contract should be signed in the services which forwarder provides. In fore-mentioned, freight forwarder should forward goods through carriers in his own name but on account of other persons. In practical operation, freight forwarder always has himself as a representative for client to contract with others for the transport need and that behavior is valid directly to client. [11] Also, when forwarder is deemed as a carrier, the contract he made is the Contract of Carriage.

2.3.1 THE CONTRACT OF OCEAN FREIGHT FORWARDER

In Civil Code Article 660, the contract of freight forwarder is that should be made by client and forwarder, and forwarder forwards goods through carrier in his own name but on account of client, for remuneration. [12] There is no regulation that the contract of freight forwarder should be made on paper, so the form of contract depends on Civil Code Article 153. When the parties have reciprocally declared their concordant intent, a contract shall be constituted to be consensual contract. Furthermore, forwarder run the business for hire, the contract also is a non-gratuitous contract.

In Civil Code Article 660 Paragraph 2 says that the provisions concerning Commission Agents shall apply mutatis mutandis to Freight Forwarder, and in Civil Code Article 577, we can know that the definition of commission agent and freight forwarder is similar, both of them are "in his own name but on account for client"."On account for client" means forwarder has contract with carrier and the result of that act which causes the benefit or loss is attributed to the client. [13] "In his own name" means that forwarder should have contract with carrier in his own name. Forwarder is a party in the contract that he makes with carrier. Therefore, client is not a party in that contract and doesn't

[7]Yu-Bo Cheng [1997]. *Civil Law: Kinds of Obligations(Part II)* [pp.268-269]. Taipei: San Min.
[8]Yu-Bo Cheng [1997]. *Civil Law: Kinds of Obligations(Part II)* [pp.268-269]. Taipei: San Min.
[9]Yi-Shan Lin [2005]. *Civil law :Transportation law* [pp.147][1st ed.]. Taipei: San Min.
[10]Yi-Shan Lin [2005]. *Civil law :Transportation law* [pp.43-44][1st ed.]. Taipei: San Min.
[11]Li Huang[2002]. *Civil Law: Kinds of Obligations(Part II)* [pp.355-356][1st ed.]. Taipei: Angle.
[12]Tsung-Chih Chiou [2002]. *New Claims Act(Part II)* [pp.624] [1st ed.]. Taipei: Angle.
[13]Yu-Bo Cheng [1997]. *Civil Law: Kinds of Obligations(Part II)* [pp.501,624]. Taipei: San Min

have any right and duty. [14] The difference between it and representative is that the act of representative should have contract in his own name and that contract is in the act of representative. [15]

2.3.2 THE CONTRACT OF CARRIAGE BY SEA

In fore-mentioned, the contract which is made by freight forwarder and client is the contract of freight forwarder, and forwarder should forward goods through carrier, for remuneration. Then, in *Civil Code Article 663* "Unless otherwise provided for by contract, the freight forwarder may himself assume the transportation of the goods, in which case he has the same rights and obligations as a carrier". And, in *Civil Code Article 664* "If a fixed price for the whole of the transportation has been agreed upon, or if the freight forwarder has himself delivered to the shipper a bill of lading, the freight forwarder is deemed to have himself assumed the transportation of the goods, in which case he is not entitled to remuneration". Therefore, when two parties agree on a price for transport and freight forwarder has himself delivered to the shipper a bill of lading, freight forwarder is deemed as a carrier and he has to undertake the obligation and liability of being a carrier.

2.3.3 THE CONTRACT OF MANDATE

If freight forwarder doesn't forward goods in his own name, he is a representative of client to contract with carrier. [16] It means that he is doing his job in client's name and the effect of his act is as same as client's. [17] The difference of in forwarder's name or not is direct representation for client or indirect. What kinds of contract that forwarder and client have in direct representation? In *Civil Code Article 528* "A contract of mandate is a contract whereby the parties agree that one of them commissions the other party to deal with his affairs, and the latter agrees to do so". Therefore, in direct representation, client commissions forwarder to find carrier to carry goods and to deal with his affairs to get pay. In this situation, the contract between freight forwarder and client is the non-gratuitous contract of mandate.

2.3 THE LIABILITY OF OCEAN FREIGHT FORWARDER

Freight forwarder should undertake different liabilities in different contracts.

2.4.1 THE LIABILITY IN THE CONTRACT OF FREIGHT FORWARDER

a. THE PRINCIPLE OF LIABILITY

In *Civil Code Article 661* "The freight forwarder is liable for any loss, damage or delay in the delivery of the goods entrusted to him, except he can prove that he has not failed to exercise due care in the reception and custody of the goods, in the selection of the carrier, in the delivery at the destination and in all other matters connected with the transportation."There are three which forwarder should be liable for as follows: (a) The loss. It means that forwarder isn't able to forward goods to consignee or client, including in physical loss and can't reply to own the goods in law, for instance, the bona fide assignee take the goods. (b) Damages. It means goods is found reduction of its values but not complete elimination. (c) Delay. It means forwarder can't forward goods to destination in time which is according to contract, if there is no agreement according to customs in Civil Code Article 632. [18] When any of the three situations happens, forwarder should undertake the responsibility of them and client can

[14]Tsung-Chih Chiou [2002]. *New Claims Act(Part II)* [pp.343][1st ed.]. Taipei: Angle.
[15]Li Huang[2002]. *Civil Law: Kinds of Obligations(Part II)* [pp.181] [1st ed.]. Taipei: Angle.
[16]Shin-ping Chang [2010]. The Liability of Freight Forwarder- The comments of number 31 verdict year 2009, Taiwan High Court. *The Law Monthly.* 61[3], 65. Li Huang[2002]. *Civil Law: Kinds of Obligations(Part II)* [pp.355][1st ed.]. Taipei: Angle.
[17]Li Huang[2002]. *Civil Law: Kinds of Obligations(Part II)* [pp.355-356] [1st ed.]. Taipei: Angle.
[18]Yu-Bo Cheng [1997]. *Civil Law: Kinds of Obligations(Part II)*[pp.628]. Taipei: San Min.

request for it, unless he can prove that he has not failed to exercise due care in the reception and custody of the goods, in the selection of the carrier, in the delivery at the destination and in all other matters connected with the transportation. Therefore, the liability of freight forwarder is the liability of constructive fault. Which is difference from the liability of typical incident that carrier undertakes.

Furthermore, the forwarder is liable for loss or damage due to apparent defects in packing, if he has accepted the goods for transportation without reservation (in Civil Code Article 665 is applicable mutatis mutandis for Article 635). The forwarder is not liable for the loss or damage of the moneys, valuable securities, jewelries or such other valuables, unless he is given notice of the nature and value of such goods when they are entrusted to him (in Civil Code Article 665 is applicable mutatis mutandis for Article 639 and paragraph 1). [19]

b. THE RANGE OF COMPENSATION FOR DAMAGES

According to the Civil Code Article 665 that Article 638 to 640 is applicable mutatis mutandis for freight forwards. Therefore, when the freight forwarder is liable for any loss, damage or delay in the delivery of the goods entrusted to him, the range of compensation for damages is the same as carrier. In compliance with the regulation of Article 638 and paragraph 1 when forwarder is confronting the case of loss, damage or delay, the damages shall be fixed in accordance with the value which the goods would have had at the destination and the time when delivery was due. The compensation for damages is limited to the objective damages of goods. It does not include the interests which client loses, and forwarder is also liable for the fault that his employees and auxiliaries make. And, what is the meaning of the time when delivery was due? If there is a time that made by client and forwarder in the contract, they should follow the contract. If there is no agreement in contract, they should follow the principles of Civil Code Article 632.

However, if the goods are lost or damaged before forwarder transferring it to carrier and forwarder has not decided the way and conveyance of transportation yet, we can't use Article 632 to regulate it because we don't know when the time of goods should be delivered is. Therefore, some scholars think under the conception of modern and generalized transport laws forwarder can possess the advantage of the highest limited liability as same as carrier can, and in fact forwarder has that advantage in Germany. It is regulated in Article 461 of German Commercial Code and Article 23 of Standard Contract Terms Act. Therefore, we can actually solve the problem of defining the time of delivery. [20]

Furthermore, according to the Article 638 and paragraph 2 of Civil Code that the freight and other expenses which need not be paid in consequence of the loss of or damage to the goods transported shall be deducted from the amount of damages specified in the preceding paragraph. And in paragraph 3 of the same Article, If the loss, damage or delay is due to the intentional acts or gross negligence of the forwarder, the client may also claim for other injuries, if any. "Other injuries" is, for instance, client can earn the interests by selling the goods which were transported to the destination. It means that forwarder shall compensate client for the injury actually happened and the interests which have been lost. [21] According to the Article 639 and paragraph 2 of Civil Code that if their value is declared the liability of the forwarder is limited to such declared value. The Article 640 of Civil Code regulates that

[19]Yu-Bo Cheng [1997]. *Civil Law: Kinds of Obligations(Part II)* [pp.629]. Taipei: San Min.
[20]Li Huang[2002]. *Civil Law: Kinds of Obligations(Part II)* [pp.366-367][1st ed.]. Taipei: Angle.
[21]Li Huang[2002]. *Civil Law: Kinds of Obligations(Part II)* [pp.366-367][1st ed.]. Taipei: Angle.

forwarder faces injuries in the case of delay in delivery shall not exceed the amount which could be claimed in case of the total loss of the goods. [22]

c. THE PRESCRIPTION OF CLAIMING FOR DAMAGES

According to the regulation of Civil Code Article 666, "Claims against a freight forwarder for loss, damage or delay in the transportation are extinguished by prescription if not exercised within one year from the date of the delivery of the goods or from the date when such delivery ought to have taken place", from this Article we know that the prescription is one year and it's a short term extinctive prescription.

2.4.2 THE LIABILITY IN THE CONTRACT OF CARRIAGE BY SEA

d. THE PRINCIPLE OF LIABILITY

When freight forwarder has intervening act in transportation and he will be assumed as a carrier. Then, according to the Article 663 and 664 of Civil Code, if forwarder is assumed as a carrier, the liability he shall liable for is same as carrier. In our Maritime Act, the liability of damaged cargoes that ocean freight carrier shall liable for is presumption of negligence. [23] Therefore, if the freight forwarder can't prove that he doesn't have any negligence in carrying out the contract, including the duty in law and the duty in contract, he shall be liable for it. However, if the cause of damage is one of the reasons in statutory exemptions regulated in Maritime Act, forwarder doesn't have to be liable. [24]

Besides, according to Article 61 of Maritime Act "Where a contract of carriage which is for the purpose of car rying individual cargo or a Bill of Lading contains a clause, covenant or an agreement diminishing or relieving the carrier or the shipowner from liability for damage to, loss of or delay to the cargo resulting from negligence or a failure to fulfill the obligations provided in this Chapter, such clause, covenant or agreement shall be null and void". Therefore, if the agreement is contravening, this article will not be valid. [25]

e. THE RANGE OF COMPENSATING OF DAMAGES

According to the Article 638 paragraph 1 of Civil Code, "In the case of loss, damage or delay, the damages shall be fixed in accordance with the value which the goods would have had at the destination and the time when delivery was due". Therefore the amount of money for damage is a sound value of the goods delivered to the destination and minus the residual value of goods.[26]

In addition, the Maritime Act Article 70 and paragraph 2 regulates that "Unless the nature and value of the cargo have been declared by the shipper before shipment and inserted in the bill of lading, neither the carrier nor the shipowner shall be liable for any damage to or loss of the cargo in an amount exceeding 666.67 Special Drawing Rights per package or 2 Special Drawing Rights per kilogram, whichever is the higher.". However, in the paragraph 4 of the same Article says that "Neither the carrier nor the shipowner shall be entitled to the benefit of the limitation of liability provided for in the preceding second paragraph if damage or loss resulted from an intended act or gross negligence of the carrier or the shipowner".

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[22]Li Huang[2002]. *Civil Law: Kinds of Obligations(Part II)* [pp.366-367][1st ed.]. Taipei: Angle.
[23]Number 2482verdict year 2009, Taiwan High Court. Number 1403 verdict year 2004, Taiwan High Court. Number 122 verdict year 2002, Taiwan High Court.
[24]Guo-Shiung Tzeng, Chih-Ching Chang [2008]. *Maritime Law* [pp.199] [3rd ed.]. Taipei: Hang He.
[25]Guo-Shiung Tzeng, Chih-Ching Chang [2008]. *Maritime Law* [pp.213] [3rd ed.]. Taipei: Hang He.
[26]Guo-Shiung Tzeng, Chih-Ching Chang [2008]. *Maritime Law* [pp.216] [3rd ed.]. Taipei: Hang He.

f. THE PRESCRIPTION OF CLAIMING FOR DAMAGES

According to the Maritime Act Article 56 paragraph 2, "The carrier and the shipowner shall be discharged from all liability in respect of the damage or loss either totally or partly, of the cargo unless suit is brought within one year of their delivery or of the date when they should have been delivered". And, because it wants to prompt the claimants to exercise their claim quickly, the limitation is one year.[27]

2.4.3 THE LIABILITY IN THE CONTRACT OF MANDATE

According to the Article 544 of Civil Code "The mandatory shall be liable to the principal for any injury resulting from his negligence in the execution of the affairs commissioned or from such acts as are beyond his authority". Therefore, forwarder shall be liable for the negligence or acting beyond his authority. (a) The compensation of the negligence in the execution of the affairs commissioned: the mandatory shall pay attention to execute the affairs commissioned. If he is careless about it, he is deemed as having negligence. However, what kind of negligence here we say? We can divide it into two parts: the gratuitous mandate and non-gratuitous mandate. (i) The former shall pay attention dealing with the affairs commissioned as he does. (ii) The latter shall follow the regulation of the Article 535 of Civil Code "The mandatory who deals with the affair commissioned, shall be in accordance with the instructions of the principal and with the same care as he would deal with his own affairs. If he has received the remuneration, he shall do so with the care of a good administrator." The indeed contract between forwarder and principal is non-gratuitous mandate. Therefore, forwarder shall obey the Article 535.[28] (b)The compensation of the acts as are beyond his authority: if forwarder is acting beyond his authority and making principal damages, he shall be liable for it.

There is no regulation about the range of compensation for damages and the prescription of claiming for damages in Obligations Section 10 - Mandate of Civil Code. Therefore, we use the Article 216 of Civil Code to regulate the former including the damages and the interests client loses and use the Article 125 to regulate the latter—fifteen years.

From the analysis above, we know that there are three types of contract which forwarder and client can make, and the liability forwarder shall be liable for is different from various contract according to table (a).

[27] Guo-Shiung Tzeng, Chih-Ching Chang [2008]. *Maritime Law* [pp.228] [3rd ed.]. Taipei: Hang He.

[28] Yu-Bo Cheng [1997]. *Civil Law: Kinds of Obligations(Part II)* [pp.439]. Taipei: San Min. Li Huang[2002]. *Civil Law: Kinds of Obligations(Part II)* [pp.83][1st ed.]. Taipei: Angle.

(a)The Comparison of different contracts that the liability forwarder shall be liable for

ITEM	The contract of freight forwarder	The contract of mandate	The contract of carriage by sea
Liability	*In Civil Code Article 661* "The freight forwarder is liable for any loss, damage or delay in the delivery of the goods entrusted to him, except he can prove that he has not failed to exercise due care in the reception and custody of the goods, in the selection of the carrier, in the delivery at the destination and in all other matters connected with the transportation." The liability of freight forwarder is the liability of constructive fault.	In the Article 544 of Civil Code "The mandatory shall be liable to the principal for any injury resulting from his negligence in the execution of the affairs commissioned or from such acts as are beyond his authority"	According to the Maritime Act Article 62, 63, 69 and 17, the carrier shall be liable for the damages which are the liability of constructive fault.

ITEM	The contract of freight forwarder	The contract of mandate	The contract of carriage by sea
The range of compensation for damages	According to the regulations of Civil Code Article 638 to 640. When the freight forwarder is liable for any loss, damage or delay in the delivery of the goods entrusted to him, the range of compensation for damages is **according to the Article 638**:(a) In the case of loss, damage or delay, the damages shall be fixed in accordance with the value which the goods would have had at the destination and the time when delivery was due. (b) The freight and other expenses which need not be paid in consequence of the loss of or damage to the goods transported shall be deducted from the amount of damages specified in the preceding paragraph. (c) If the loss, damage or delay is due to the intentional acts or gross negligence of the carrier, the sender may also claim for other injuries, if any. **And the Article 639:** If their value is declared the liability of the forwarder is limited to such declared value. **And the Article 640**: Forwarder faces injuries in the case of delay in delivery shall not exceed the amount which could be claimed in case of the total loss of the goods	According to the Article 216 of Civil Code which includes the damages and the interests client loses.	According to *the Article 638 paragraph 1 of Civil Code* "In the case of loss, damage or delay, the damages shall be fixed in accordance with the value which the goods would have had at the destination and the time when delivery was due." The Article 70 paragraph 2 of Maritime Act"Unless the nature and value of the cargo have been declared by the shipper before shipment and inserted in the bill of lading, neither the carrier nor the shipowner shall be liable for any damage to or loss of the cargo in an amount exceeding 666.67 Special Drawing Rights per package or 2 Special Drawing Rights per kilogram, whichever is the higher." In the paragraph 4 of the same Article "Neither the carrier nor the shipowner shall be entitled to the benefit of the limitation of liability provided for in the preceding second paragraph if damage or loss resulted from an intended act or gross negligence of the carrier or the shipowner"

ITEM	The contract of freight forwarder	The contract of mandate	The contract of carriage by sea
The prescription of claiming for damages	In Civil Code Article 666, "Claims against a freight forwarder for loss, damage or delay in the transportation are extinguished by prescription if not exercised within **one year** from the date of the delivery of the goods or from the date when such delivery ought to have taken place."	According to the Article 125 of Civil Code, the prescription is **fifteen years**.	According to the Maritime Act Article 56 paragraph 2, "The carrier and the shipowner shall be discharged from all liability in respect of the damage or loss either totally or partly, of the cargo unless suit is brought within **one year** of their delivery or of the date when they should have been delivered".

Source: This Paper

2.5 THE COMMENTS OF NUMBER 3 VERDICT YEAR 2011, KAOHSIUNG BRANCH, TAIWAN HIGH COURT

2.5.1 SUMMARY OF FACTS

The appellant entrusted a batch of plantlets of phalaenopsis to appellee to forward it from Kaohsiung Port to Chencun in China. Appellee hired OOCL company to carry the goods. When the goods got to Chencun, appellant found that the goods whitened and had bacterial infections. Naturally, appellant sued for damages.

Appellee defended that the contract both parties made was the contract of mandate, not the contract of freight forwarder. The carrier was OOCL and shipper was appellant we could find in bill of lading and appellee said he was the representative of appellant. He booked the shipping space appellant asked to and he did not forwarding goods through carrier with his own name. He didn't have any negligence in this delivery procedure.

2.5.2 THE GIST OF THE JUDGEMENT

Judge made a gist for the contract which is the contract of freight forwarder or mandate as follows: The Article 660 of Civil Code regulated that "A freight forwarder is a person, who undertakes, as a business, to forward goods through carriers in his own name but on account of other persons, for remuneration". Ocean bill of lading of goods in this case was recorded that the shipper was appellant, consignee was SzJiChing company, and the appellee was freight forwarder. It was enough to be considered that the contract of carriage existed between appellant and OOCL. The appellee didn't forward goods through carrier in his own name.

According to the Article 625 of Civil Code "If required by the shipper, the carrier shall make and shall issue to him a bill of lading after receiving the goods of delivery" After issuing a bill of lading to shipper, there are two legal relationships between carrier and shipper: one is the contract of carriage and the other one is the obligation of bill of lading. Before shipper transferred the bill of lading to other people, the obligation between shipper and carrier was based on the contract of

carriage. On the contrary, when the bill of lading was being transferred to other people, the owner of bill of lading could ask carrier to give the goods to him. Then, appellant defended that the bill of lading only could represent appellee was the owner of goods. However, the judge thought it didn't have enough evidence that appellant used to stand the contract made by two parties which was the contract of freight forwarder.

Also, appellee stands that he was not only executing the affair of transport but also some other affairs. For instance, he represented appellant to deal with customs. Appellee wasn't only forwarding goods through carrier but also dealt with the other affairs about whole transport commissioned. Therefore, it was deemed that the contract between two parties was the contract of mandate.

2.5.3 THE COMMENTS

The judge considered that the contract between ocean freight forwarder and client was the contract of mandate, not the contract of freight forwarder. The main reason was as follows: (a) Appellant was the shipper recorded on ocean bill of lading, and the contract of carriage existed between appellant and OOCL, also appellee didn't forward goods through carrier with his own name. (b) Appellant defended that the bill of lading only could represent appellee was the owner of goods. However, the judge thought it didn't have enough evidence that appellant used to stand the contract made by two parties which was the contract of freight forwarder. (c) Appellee wasn't only forwarding goods through carrier but also dealing with the other affairs about whole transport commissioned. Therefore, it was deemed that the contract between two parties was the contract of mandate.

The judge considered the shipper written on the bill of lading was the principal and forwarder was in principal's name to make carrier carry goods not with his own name, and deemed the contract was the contract of mandate. It was not thought to be appropriate that judge used this point to make the adjudgment. In the practical operation of freight forwarder, whether the shipper written on the bill of lading is freight forwarder or not, he is the person to book the shipping spaces. In addition, the bill of lading is just a proof of the contract of carriage by sea and the shipper written on the bill of lading is not definite the real principal of the contract of carriage. Therefore, it's not appropriate that the judge only used the point which the shipper written on the bill of lading was not freight forwarder to judge that forwarder made carrier carry goods not with his name, and the contract made by principal and forwarder wasn't the contract of freight forwarder. In this paper, we know that the liability in the contract of mandate or freight forwarder is different. Mandatory shall be liable for more strict liability in the contract of mandate.

In addition, some scholars think that the most important thing against principal is whether the consignee can receive the goods. Also, in practical operation, forwarder usually acts as a representative to make all the contracts required in transport after he makes the contract of freight forwarder with principal. The difference between the practical operation and the Article 660 of Taiwanese Civil Code which regulates that forwarder shall execute the obligation of the contract of freight forwarder with his own name is that the former is directly representing and the latter is indirectly representing. Therefore, whether directly or indirectly representing, forwarder executes the same affairs in both situations. In Germany, the theory has been recognized that even if the relation between forwarder and client is direct, it will not influent the validness of the contract of freight forwarder. Also, in the Article 453 of German Commercial Code is no longer regulating that forwarder shall execute his work with his own name.[29] Thus, our research also considers that the contract made by forwarder who needs to deal with the affairs of transport is the contract of freight

[29]Yi-Shan Lin [2005]. *Civil law :Transportation law* [pp. 44][1st ed.]. Taipei: San Min.

forwarder. Therefore, we can clear know the liability forwarder shall be liable for.

3. CONCLUSION

According to the regulation of Civil Code and Shipping Act, a freight forwarder is a person, who undertakes, as a business, to forward goods through carriers in his own name but on account of other persons, for remuneration and the contract made by forwarder and client is the contract of freight forwarder. If forwarder didn't forward goods through carrier with his own name, the contract is the contract of mandate. In addition, forwarder may be deemed as a carrier because of the intervening act in transportation and make the contract become the contract of carriage. Thus, forwarder accepts the mandate from client, accomplishes the affairs commissioned and will make the contract. And, contract may be a contract of freight forwarder or mandate or carriage, there has different liability, obligation and right in different contract.

In the case we mentioned above, the judge used a point that the shipper had written on the bill of lading which is the client not the forwarder, and forwarder didn't use his name to make carrier carrying goods. Therefore, the contract made by forwarder and client was the contract of mandate, not freight forwarder. However, in practical operation of freight forwarder, sometimes will make carrier write the client's name on shipper section of bill of lading. According to the judge's opinion, it would make the contract made by forwarder and client becoming a contract of mandate. It's too strict for forwarder not fit into the practical situation. Although the forwarder doesn't do his job with his own name, the service doesn't make any difference. Thus, this research considers that the definition of freight forwarder in Civil Code shall be reconsidered that if it is really necessary to regulate forwarder who shall execute affairs for client "with his own name". Maybe we can follow the example of German Commercial Code that forwarder doesn't have to execute affairs in his own name, but the contract he makes with client also is the contract of freight forwarder.

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A Study on the Carrier's Liability of the Amphibious Vehicle under Taiwan Law

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ABSTRACT: The DUKW (or as we like to call them 'Ducks') was an amphibious landing craft developed by the United States Army during World War II for transporting goods and troops over land and water. Now, Kaohsiung City Government has imported two amphibious vehicles to promote the city's sightseeing attractions. These vehicles provide passengers with a special experience of being in and out of water. However, there was an accident with this kind of vehicle in America two years ago. Amphibious vehicles are vehicles or crafts, which is a mean of transport, viable on land as well as in water. In this case, the matter shall be subject to the rules relating to the carriage of passengers by sea and land. Therefore, this paper clarifies the definition of amphibious vehicle passenger transport contract and explores the system of the carrier's liability. Finally, this paper found the liability of Kaohsiung DUKW carrier shall be subject to the Civil Law, and cannot limit the liability under the Maritime Act.

Keywords: Duck Boat, Amphibious Vehicle, the Carriage of Passenger, Carrier's Liability

1. INTRODUCTION

The Standard of living has been improved as time progresses. Not only land but also water entertainment qualities have been gradually emphasized. Such as yacht, cruise ship, recreational fishing or whale watching. In addition, there is a special entertainment that can provide an on-land sailing, Duck Tour with an amphibious vehicle. An amphibious vehicle (or simply amphibian), is a vehicle or craft, that is a means of transport, viable on land as well as on water.[1] It was an amphibious landing craft developed by the United States Army during World War II for transporting war supplies and troops over land and water and was first used in tourism in Boston, America, and was highly praised. It can be drove on land and down in the water provides two different experiences at one time, letting tourists to experience a feeling of on-land sailing. The popularity of Duck Tour has grown among tourists and also has become a keen tool for many countries to promote city tours, and thus Duck Tour is imported in many countries one after another. An amphibious vehicle which can be drove on land and down in the water provides two different experiences at one time, letting tourists to experience a feeling of on-land sailing.[2] During the tour, passengers can know about the local culture, customs and see some well-known sightseeing spots and historical remains. Amphibious vehicles have already been introduced into more than 50 harbor cities including London, Osaka and Singapore for touristic purpose.[3] This interesting tour is a nice way for marketing their

[1] http://en.wikipedia.org/wiki/Amphibious_vehicle (accessed 20 Dec., 2013).
[2] http://epage.khbus.gov.tw/ezfiles/0/1000/img/9/index.html (accessed 20 Dec., 2013).
[3] Lu-Yen Chen[2010]. *A study on relative laws for Amphibious Vehicle Inspection between Taiwan and American* [pp.2]. Unpublished master's thesis, National Kaohsiung Marine University, Kaohsiung.

own tourism and it has been bringing a great income for these cities.

Kaohsiung City has imported two amphibious vehicles, named amphibious vehicle 1 and amphibious vehicle 2, as we called Duck Boat in 2009 and 2010 to cruise the shore sceneries of Kaohsiung city. And they also provide tourists a leisure transportation time combining with touristic values and an adorable look to catch people's eyes. Many tourists from different places were attracted and climbed aboard duck boat for a fun land and water adventure of the city. Presently, there are two routes, Lotus Pond and Love River. In 2012, the passengers taking riding is 0.785(See table 2). It shows that the duck boat has been accepted and become more and more popular.

However, there was a duck boat accident happened in Philadelphia, America. The accident as follows:

On Wednesday, July 7, 2010, the empty 250-foot-long sludge barge The Resource, being towed alongside the 78.9-foot-long tugboat Caribbean Sea, collided with the anchored 33-foot-long amphibious passenger vehicle DUKW 34 in the Delaware River in Philadelphia, Pennsylvania. DUKW 34 carried 35 passengers and 2 crewmembers. On board the Caribbean Sea were five crewmembers. As a result of the collision, DUKW 34 sank in about 55 feet of water. Two passengers were fatally injured, and 26 passengers suffered minor injuries. No one on the Caribbean Sea was injured. Damage to DUKW 34 totaled $130,470. Damage to the barge was minimal and no repairs were made.[4]

According to the National Transportation Safety Board, the major safety issues identified in the accident investigation are as follows[5]:

1. Vehicle maintenance
2. Maintaining an effective lookout
3. Use of cell phones by crewmembers on duty
4. Response to the emergency by Ride The Ducks International personnel

Some issues of ships owner's personnel training and the safety policy were identified in this accident, including using of cell phones by tugboat crewmembers on duty caused lack of maintaining an effective lookout, the maintenance personnel of the DUKW 34 failured to ensure the surge tank pressure cap was securely in place, and the improper response to the emergency by Ride The Ducks International personnel that the reckless master anchored the duck boat in the navigable channel and several passengers stated that they had been able to get a lifejacket over their heads, but none of them was able to fully done the jacket and fasten it properly. In addition, the manager-on-duty of Ride The Ducks International didn't notify the Coast Guard the anchored situation of the duck boat required by the U.S. Coast Guard regulations and company policy.

According to CNN News, The distracted tugboat pilot who crashed a barge into a sightseeing "duck boat," killing two tourists, was sentenced to a year and a day in prison for his role in the incident.[6] During the maritime litigation of this accident, both parties, K-Sea Transportation Partners owner-operator of the the tugboat, which was pushing the barge and Ride the Ducks International, LLC, a Georgia-based company, and subsidiary of Herschend Family Entertainment, that owned, maintained, and operated the 33-foot amphibious tour boat, DUKW 34, are claiming that under an archaic 1851 Federal maritime limitation of liability law, their total liability should be capped at the value of the vessels involved in the accident. K-Sea estimates the value of the tug at $1.65 million, and Ride the Ducks asserts $150,000 in total liability based on the value of the

[4] http://www.ntsb.gov/investigations/summary/MAR1102.html (accessed 20 Dec., 2013).
[5] http://www.ntsb.gov/investigations/summary/MAR1102.html (accessed 20 Dec., 2013).
[6] Philadelphia (CNN), Tugboat pilot gets year in jail for fatal 'duck boat' accident, http://edition.cnn.com/2011/11/01/justice/pennsylvania-duck-boat-sentence (accessed 11 Mar., 2013).

salvaged duck boat.[7] Eventually, the operators of two vessels involved in the "duck boat" accident on the Delaware River have reached a $17 million settlement with the victims and the families of the two Hungarian students who died that day. The families of the Dora Schwendter and Szabolcs Prem will split $15 million, and nearly 20 other victims who involved in the accident will split $2 million.[8]

As this incident happened, there are some questions need to be clarified. First, if the duck boat in Kaohsiung had accidents and people got injured who would be responsible for it? Second, the amphibious vehicle not only can be driven on land but also in water. What kind of characteristic of transportation contract is it and what rules does it apply? There is the discovery of the transportation liability of the amphibious vehicle as follow.

2. BRIEF OPERATION OF AMPHIBIUS VEHICLE OF KAOHSIUNG

Kaohsiung is the first county imported the amphibious vehicle to promote city tours in Taiwan. There are two routes you can choose in this tour. One is the Lotus Pond Route stop which is located in Kaohsiung Products Stores and sails on Lotus Pond. The other one is Love River Route stop which is located in Dream Mall on weekday and Pier-2 Art Center on weekend. Approximately 60 minutes in a tour to have an overview of the city. According to Kaohsiung City Bus Service Administration, there is Brief operation of amphibious vehicle of Kaohsiung as follow:

2.1 The Operation Rule before the Tour

Kaohsiung is full of water resources and recently, government advocates a purpose of combining land tour with water area and a policy of Jurisdictional Unification of Harbor Bureau and City Government to promote the city tourism. For the above reasons, Kaohsiung City imported two amphibious vehicles for the public to see the street landmarks and cruise the shore sceneries of Kaohsiung city in 2000 and 2010. They were named amphibious vehicle 1 and 2, also called duck boats. The vehicle was 10 meters long and 8 meters wide with 19.5 tons in weight. The vessel‘s Supervisor authorized it to carry a maximum of 30 persons, including a 2-person crew.[9] To provide a better transportation quality, the Kaohsiung City Bus Service Administration plans to import two more vehicles to attract tourists. The administration wishes that it could create a nice promotion and a great commercial possibility of this extensible harbor city.[10]

Figure 1 Amphibious Vehicle 1

Figure 2 Amphibious Vehicle 2

Source : Brief introduction of Duck Tour, http://epage.khbus.gov.tw/ezfiles/0/1000/img/3/introduction.html

[7] Personal Injury Attorneys Saltz Mongeluzzi Barrett & Bendesky PC, Federal Trial Begins in Fatal Duck Boat Disaster, http://www.smbb.com/media-center/news/federal-trial-begins-in-fatal-duck-boat-disaster (accessed 11 Mar., 2013); http://www.rawle.com/images/uploads/general/RRV17N1.pdf (accessed 01 Dec., 2013).

[8] Philadelphia (CNN), http://edition.cnn.com/2012/05/09/justice/pennsylvania-duck-boat-settlement (accessed 11 Mar., 2013); Personal Injury Attorneys Saltz Mongeluzzi Barrett & Bendesky PC, $17 Million Duck Boat Trial Settlement, http://www.smbb.com/media-center/press-releases/$17-million-duck-boat-trial-settlement. (accessed 01 Dec., 2013).

[9] Kaohsiung City Bus Service Administration[2010]. application of Kaohsiung city route. P.4.

[10] Transportation Bureau, Kaohsiung City Government, http://www.tbkc.gov.tw/news.asp?id=1945(accessed 11 Mar., 2013).

The Kaohsiung City Bus Service Administration follows the motor vehicle transportation management rules and the motor boat navigation management rules to get the amphibious licenses both on land and in water so that it can have an amphibious vehicle operation right.[11] There is no particular rule for amphibious vehicle. Therefore, this vehicle shall not only obey the motor vehicle rules but also the motor boat rules to have registration, inspection and two licenses. In order to import the amphibious vehicles and let them reach the request of those rules to get motor vehicle and motor boat operation licenses, the government of Kaohsiung required the amphibious vehicle manufacturing company to obey the regulations of our country when the vehicles were made. However, there are still some different parts for the motor vehicle vessel rules. Therefore, the government amends some rules just for the amphibious vehicle.[12] In addition, the driver of amphibious vehicle not only needs to have a professional bus driver's license or a professional trailer driver's license with more than one year driving experience but also require a motor boat driver's license without any accident record and the driver should have taken survival training courses as well. [13]Moreover, consider having a safe tour, the duck tour operating time is from 12:00 to 17:00.

To adequately repair and maintain the amphibious vehicle, the Kaohsiung City Bus Service Administration set up the daily work the drivers need to check carefully. For example, the inspection of vehicle's hull, engine and the testing in water and so on. Furthermore, there are regulations to have maintenance and check up at certain time or miles. To insure having a well condition driver in a safe tour, the administration not only assign auditors to examine the operating situation irregularly but also arranging different shifts and back up stuff.[14] To avoid accidents of amphibious vehicle from happening, there are lots rules of different aspects set up and followed so that when encountering unexpected situations, the crews can do the most appropriate response in emergency to provide a secure tour for passengers and prevent them from being in danger.

2.2 The Ticket of Duck Tour

There are two ways to buy the ticket for Duck Tour. You can buy it on the spot or use the i-bon system at 7-11 to make a reservation. And, it also provides a booking service. The ticket charge is different depends on you are citizen of Kaohsiung or not and what day you go. The ticket types include adult ticket, child ticket and insurance ticket (Children under age 1). The back contents of the ticket are as below:

1. Passengers shall follow the date the ticket seal shows and you can't use it if there is no seal of the Kaohsiung City Bus Service Administration or if the ticket is expired.

2. Passengers can refund the tickets 20 minutes before the scheduled departure time should any natural disaster or irresistible force occurs.

3. According to Ministry of Transportation and Communication (MOTC), each passenger is insured for car and ship for NT$ 2,000,000.

2.3 The Routes of Duck Tour

There are two route choices in this tour. One is the Lotus Pond Route stop which is located in Kaohsiung Products Stores and sails on Lotus Pond. The other one is Love River Route stop which is located at Dream Mall on weekday and Pier-2 Art Center on weekend. The business hours are from Tuesday to Sunday and close on Monday for maintenance. Both routes offer 4 reserve runs and 6 regular runs daily (See table 1).

[11] Kaohsiung City Bus Service Administration[2010]. application of Kaohsiung city route. P.4.
[12] Kaohsiung City Government, http://law.kcg.gov.tw/law/NewsContent.aspx?id=189 (accessed 04 May, 2013).
[13] Kaohsiung City Bus Service Administration[2010]. application of Kaohsiung city route. P.4.
[14] Kaohsiung City Bus Service Administration[2010]. application of Kaohsiung city route. P.4-5.

Table 1 Brief of the amphibious vehicle routes

Route	Lianchitan Route	Love River Route 1	Love River Route 2
stop	Kaohsiung Products Stores	Dream mall	Pier-2 Art Center
Sailing area	Lotus Pond	Glory Pier(Driving to the waters between Kaohsiung bridge Zhong-Zheng bridge)	Glory Pier(Driving to the waters between Kaohsiung bridge Zhong-Zheng bridge)
Path	Start form Kaohsing Products Store→Huan-Tan Rd.→Cui-Hua Rd.→Sheng-Li Rd.→Zuo-Ying Avenue→Kong-Ying Rd.→Confucian Temple Plaza→Approach Way→Lotus Pond→Confucian Temple Plaza→Lian-Tan Rd.→Ming-Tan Rd.→Duck Tour Stop which is located in Kaohsing Products Store	Start from Cheng-Gong Rd.→ Qing-Nian Rd.→Hai-Bian Rd.→Glory Pier(Driving to the waters between Wu-Fu bridge with Zhong-Zheng bridge), along the original route return to Dream mall	Start from Da-Yong Rd.→Gong-Yuan Rd.→Qi-Xian Rd.→Banana Pier→Lin-Hai 3rd Rd.→Lin-Hai 1st Rd.→Lin-Hai 2nd Rd.→Peng-Lai Rd.→Qi-Xian Rd.→Wu-Fu Rd.→Hai-Bian Rd.→Glory Pier(Driving to the waters between Kaohsiung bridge Zhong-Zheng bridge)→Hai-Bian Rd.→Wu-Fu Rd.→Gong-Yuan Rd.→Da-Yong Rd.→Pier-2 Art Center
Distance	land：7 miles water：1miles	land：6 miles water：1miles	land：6 miles water：1miles
Run	Tuesday to Sunday 10 runs/day	Tuesday to Friday 10 runs/day	weekend 10 runs/day
Time	08：00～18：00		
Ticket	Citizen	Weekday - Full Fare 200；Half Fare 100 weekend- Full Fare 250；Half Fare 125	
	Non-citizen	Weekday - Full Fare 250；Half Fare 125 weekend- Full Fare 300；Half Fare 150	

Resource: the Kaohsiung City Bus Service Administration,

http://epage.khbus.gov.tw/ezfiles/0/1000/img/9/index.html (accessed 20 Dec., 2013)

2.4 Amphibious Operate Statistic Information

It has been operating for 3 ~ 4 years since Kaohsiung has imported amphibious vehicle 1 and 2 from America in 2009 and 2010. However, there are only 2012 and 2013 Amphibious Operating statistic information were uploaded on the website of Kaohsiung City Bus Service Administration. Table 2 and table 3 show the operating statistic information from April 2012 to March 2013. According to the information, July and August in summer time and January and February in winter time, more tourists came to experience the Duck Tour than other months. And, the passenger riding rate of Love River Route is 76% per run which was better than Lotus Pond Route at 70% per run.

Table 2 Operating statistic information from April 2012 to March 2013

	Apr. 2012	May 2012	Jun. 2012	Jul. 2012	Aug. 2012	Sept. 2012	Oct. 2012	Nov. 2012	Dec. 2012	Jan. 2013	Feb. 2013	Mar. 2013
Distance/per	15	15	15	15	15	15	15	15	15	15	15	15
Run	246	252	212	315	214	312	219	174	184	223	292	190
Distance (kilometer)	2,597.2	2,880.7	2,193.1	2,279.0	1,540.0	2,339.0	1,682.0	1,743.4	1,873.7	2,384.4	2,970.3	1,986.7
Passenger	5,775	4,907	4,423	8,525	5,651	4,780	4,445	3,457	3,945	4,375	6,910	2,926
Passenger-Kilometers	24,055	21,081	22,101	34,233	27,118	22,710	19,299	15,220	18,552	22,224	36,316	13,744
Income (NT$)	654,765	590,663	589,081	937,030	712,221	566,559	493,282	383,628	422,374	590,567	1,216,044	488,383

Resource: the Kaohsiung City Bus Service Administration,

http://www.khbus.gov.tw/files/11-1000-105-1.php (accessed 5th May, 2013).

Table 3 Operating statistic information in 2012

起訖站別路線	per Distance (km)	Vehicle (unit)	Cruise (run)	Distance (km)	Passenger (people)	Income (NT$)
Sum of Amphibious Vehicle	15.00	2.00	2,841	26,548.80	62,679	7,438,409
Amphibious Vehicle 1 (Lotus Pond Route)	8.00	1	871	6,880.00	17,144	2,147,205
Amphibious Vehicle 2 (Love River Route)	7.00	1	1,412	9,974.00	29,911	3,765,801
Booking Service	-	-	558	4,118.80	15,624	1,525,403

Resource: the Kaohsiung City Bus Service Administration,

http://www.khbus.gov.tw/files/15-1000-3046,c107-1.php (accessed 5th May, 2013).

3. THR CONTRACT OF AMPHIBIUS BEHICLE

Transportation means transport people and cargos to a specific spot that is set on the contract by means of transportation. Also, signify that this transport regards the change of space and needs to have a destination.[15] As to business point, transportation is the shorten way to represent the operator of transportation. The operator of transportation is a carrier industry engaging in transporting of passengers and cargoes by power-driven or non-power-driven transportation, wherefrom it receives remuneration.[16] The Definition of carrier in Business Tax Act is an industry engaging in transporting of passengers and cargoes of water, air or land by vessels, vehicles or planes[17].

There is not a clear definition of Contract of Carriage in Civil Code. According to Civil Code Article 622, the definition of a carrier is a person who undertakes as a business to transport goods or passengers for freight.[18] Therefore, a Passenger Carriage is a contract whereby the parties agree that one of them shall undertakes as a business to transport passengers and the sender shall pay freight for it. And, the carrier shall for the purpose of transport goods or passengers business for freight. If the sender is also the passenger self, that the sender shall be a natural person instead of juristic person. Moreover, the children who do not need to buy ticket also being a passenger and qulify to

[15] Yi-Shan Lin [2005]. Transportation law [pp.3]. Taipei: SanMin.
[16] Chun-Tang Liu [2003]. *particular kinds of obligations: Part Ⅱ*[pp.407]. Taipei: Author.
[17] http://law.moj.gov.tw/LawClass/LawContent.aspx?PCODE=G0340080 (accessed 11 Mar., 2013)
[18] Chun-Tang Liu [2003]. *particular kinds of obligations: Part Ⅱ*[pp.408]. Taipei: Author.

the contract of passenger carriage.[19]

The contract for the purpose of providing passengers for carriage is not necessary to be made in writing in Civil Code. Therefore, it belongs to a consensual contract. Though there is usually a ticket when booking carriage service, the ticket is not the qualification of established contract. Hence, this contract for passenger carriage needs not to be done in writing, but its ticket could authenticate the established passenger carriage contract while it has been issued.[20]

The ticket of the contract of passenger carriage is a security.[21] According to Civil Code Article 719, bearer security may be assigned by way of delivery of the security. And, a specified security may be transferred with endorsement thereon by the holders while an unspecified security can't.[22]

According to the operation of amphibious vehicle in Kaohsiung, a contract of amphibious vehicle is a passenger carriage contract which has an agreement whereby the parties agree that one of them shall undertakes as a business to transport passengers by amphibious vehicle from place A to place B and then go back to place A as the final destination and the sender shall pay for freight for this tour. However, this carriage includes both of land and water area, so there is a problem to define what kind of contract it is. It is called combined transport when the goods carriage route transport by both road and water. And, the combined transport is a contract of carriage of goods whereby the parties agree that one of them shall undertake as a business to transport goods by unless 2 kinds of transportation and make the goods arrive at the final destination.[23]

Amphibious vehicle could transport passengers on land and in water by just one kind of transportation. It seems that it there are differences between the combined transports of goods. Nevertheless, amphibious vehicle carriage not only transports passengers on land but also in water, providing an entertainment of combined transport for tourist. The only difference of combined transports of goods is that passengers need not to transfer to another kind of transportation in the whole route. Amphibious vehicle could be a motor vehicle when driving on land while be a vessel when sailing in water. In addition, there are different risks on different type of route. Japan also defines this kind of transport way as a combined transport.[24] However, there is not a clear definition of the contract of amphibious vehicle carriage under Taiwan law. Therefore, according to the different risk character on land and on water, we need to apply different regulations of law in different types of route.

4. THE CARRIER'S LIABILITY OF THE AMPHIBIOUS VEHICLE UNDER TAIWAN LAW

The Amphibious Vehicle provides passenger tourism and recreation service which combines the land and water routes of carriage. Therefore, according to the different risk character on land or water route, it shall be applicable to different regulations of law in different types of route. According to the Taiwan law, Amphibious Vehicle shall follow on the land regulations, such as Civil Code and Highway Act when driving on the road and also shall follow the water regulations, such as Maritime Act when sailing in the water. under Article 5 of the Maritime Act, "The maritime matters shall be subject to regulations of this Code; anything not regulated in this Code shall be subject to the provisions laid out in the other Laws.", and the rule that special law shall prevail where

[19] Chun-Tang Liu [2003]. *particular kinds of obligations: Part Ⅱ*[pp.477]. Taipei: Author.
[20] Chun-Tang Liu [2003]. *particular kinds of obligations: Part Ⅱ*[pp.478]. Taipei: Author.
[21] Chun-Tang Liu [2003]. *particular kinds of obligations: Part Ⅱ*[pp.478]. Taipei: Author.
[22] Chun-Tang Liu [2003]. *particular kinds of obligations: Part Ⅱ*[pp.479]. Taipei: Author.
[23] Yi-Shan Lin [2005]. Transportation law [pp.52]. Taipei: SanMin.
[24] Lu-Yen Chen [2010]. *A study on relative laws for Amphibious Vehicle Inspection between Taiwan and American* [pp.2]. Unpublished master's thesis, National Kaohsiung Marine University, Kaohsiung.

general law are inconsistent with special law (special law first is suitable for principle), the land regulations could also be followed when sailing in water. Hence, there is a requirement to analyze how the carrier's liability of the amphibious vehicle is under Taiwan Law.

4.1 The Regulations of Amphibious Vehicle on Land

There are some regulations of amphibious vehicle on land such as Civil Code, Highway Act, motor vehicle transportation management rules and Compensation for Death or Injury and Medicare Subsidy of Motor Vehicle Carriage Accident Rules etc. It is divided into parts for the loss of passenger, including the injury suffered by the passenger in consequence of the transportation, and the delay in the transportation, for the loss of passenger's property, including the loss or damage of the luggage that has or hasn't been entrusted to carrier by passengers. There is analysis of the above regulations of amphibious vehicle on land as follow.

4.1.1 The Carrier's Liability of Passengers

4.1.1.1 The Liability Principle

under Article 654, Paragraph 1 of the Civil Code, "The carrier of passengers shall be liable for any injury suffered by the passenger in consequence of the transportation, and for the delay in the transportation, except the injury or the delay is due to the negligence of such passenger or the injury is due to force majeure", the carrier's liability of passengers could divide into the injury suffered by the passenger in consequence of the transportation, and the delay in the transportation. In addition to getting injured, the injury also includes death, diseases and the damage of an artificial limb or clothes in consequence of the transportation. And delay means the vehicle can't arrive at the final destination on time.[25] Furthermore, under Article 654, Paragraph 2 of the Civil Code, If the delay of the transportation is due to force majeure, unless otherwise provided by the trade custom, the liability of the carrier of passengers shall be limited to the increased necessary expenses paid by the passenger due to the delay of the transportation, the carrier's liability of passenger is based on the principle of strict liability.[26]

Under Article 654 of the Civil Code, there are two exception reasons of the injury suffered by the passenger in consequence of the transportation as follow:

1. The injury or is due to the negligence of such passenger:

It means the injury is all because of the negligence of passenger without intentionally or negligently actions of carrier. The carrier of passengers shall be liable for the intentionally or negligently actions that also made the injury. However, the carrier could claim the right under Civil Code §217 to reducing the compensation.[27]

2. The injury is due to force majeure:

For instance, the sudden falling rocks make people injured or the unexpected raising temperature makes people's death.

Carrier has a burden of proof of these two exception reasons. Therefore, the carrier's liability of the injured passenger is based on the principle of strict liability.

Also, under Article 654 of the Civil Code, there is only one exception reason of the delay in the transportation; carrier shall be liable for the delay that due to force majeure:

1. The delay or is due to the negligence of such passenger:

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[25] Chun-Tang Liu [2003]. *particular kinds of obligations: Part Ⅱ*[pp.480]. Taipei: Author.

[26] Tsong-Juh Chiu [2002]. *Particular kinds of obligations: Part Ⅱ*[pp.553]. Taipei: Angle.

[27] Chun-Tang Liu [2003]. *particular kinds of obligations: Part Ⅱ*[pp.480]. Taipei: Author.

The object that carrier claim must be the negligent passenger. And carrier still is liable for other passengers of the delay in the transportation.[28]

2. The delay is due to force majeure:

According to the legislation reasons of Article 654 of the Civil Code, due to a disadvantaged minority of passengers and all men should be treated with justice, the carrier of passengers shall be liable for the delay that is because of force majeure and the carrier could disperse its loss by having liability insurance.[29] Hence, carrier has the liability of force majeure liability for the delay of damage compensation.[30]

4.1.1.2 The Compensation

1. The injured of passenger

There is no limitation rule for the damage compensation of the cargo carrier.[31] Under the Article 216 of the Civil Code, "unless otherwise provided by the act or by the contract, the compensation shall be limited to the injury actually suffered and the interests which have been lost.", the carrier shall pay the full compensation of the damage or loss. However, the freight and other expenses which need not be paid in consequence of the loss of or damage shall be applicable to Article 638, Paragraph 2 of the Civil Code shall be deducted from the amount of damages specified in the preceding damages.[32]

2. The delay of carriage

Under Article 654, Paragraph 2 of the Civil Code there is difference between the delay is due to force majeure or not:

(1) The delay is due to force majeure

Unless otherwise provided by the trade custom, the liability of the carrier of passengers shall be limited to the increased necessary expenses paid by the passenger due to the delay of the transportation so that the passenger would not liable too much. For example, the increased necessary expenses of living or transportation.

(2) The delay is not due to force majeure

Under the Article 216 of the Civil Code, "unless otherwise provided by the act or by the contract, the compensation shall be limited to the injury actually suffered and the interests which have been lost.", the carrier shall pay the full compensation of the damage or loss.[33]

Moreover, under Article 64, Paragraph 1 of the Highway Act, "In the case of traffic accidents causing injury or death to passengers or other people, or damage or loss to money or property, automobile or trolley transportation providers shall be liable for the damage and compensate for it. However, the providers are not liable to pay damage compensation if it can be proven that the accident was due to force majeure or fault of the shipper or recipient of carried goods." The carrier's liability of passengers is based on the strict liability in damage compensation which is the same as the liability under the Civil Code. Besides, under Article 64, Paragraph 3 of the Highway Act, "The rule of damage compensation applicable to the injury or death of passengers or other people will be separately determined by the MOTC." Thus, the MOTC created the Compensation for Death or

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[28] Chun-Tang Liu [2003]. *particular kinds of obligations: Part Ⅱ*[pp.480]. Taipei: Author.

[29] Legislation reasons of Article 654 of the Civil Code, http://lis.ly.gov.tw/lgcgi/lglaw?@172:1804289383:f:NO%3DE04509*%20OR%20NO%3DB04509$$10$$$NO-PD (accessed 11 Mar., 2013).

[30] Chun-Tang Liu [2003]. *particular kinds of obligations: Part Ⅱ*[pp.480]. Taipei: Author.

[31] Article 638, Paragraph 1 of the Civil Code.

[32] Chun-Tang Liu [2003]. *particular kinds of obligations: Part Ⅱ*[pp.482]. Taipei: Author.

[33] Chun-Tang Liu [2003]. *particular kinds of obligations: Part Ⅱ*[pp.482]. Taipei: Author.

Injury and Medicare Subsidy of Motor Vehicle Carriage Accident Rules, under Article 3, Paragraph 1 of this rule, the carrier of passengers shall be liable for compensation of the injury suffered by the passenger and the loss or damage of passenger's property in consequence of the transportation, the assert of compensation as follow:

1. The maximum compensation amount of death is NT$2,500,000.
2. The maximum compensation amount of serious injure is NT$1,400,000.
3. The maximum compensation amount of injure is NT$400,000.

Under Paragraph 3 of the same Article, the compensation would not be limited in the preceding section if the person who has proof of the claim for higher compensation of the loss. And the right of claim litigation wouldn't be influenced by this standard. Besides, Under Paragraph 4 of the same Article, The carrier of passengers shall be liable for any injury suffered by the passenger in consequence of the transportation, and for the delay in the transportation, except the injury is due to force majeure, the carrier has the right to claim for reducing the compensation of the subsidies for funeral Costs and medical expenses under the standards as follow:

1. Maximum compensation amount of death is NT$100,000.
2. Maximum compensation amount of injure is NT$70,000.

It's limited to the expenses in the public hospital or the medical institution established and maintained by the government, except the emergency expenses. All the compensation shall follow Article 116 of the Constitution of the Republic of China (Taiwan), "Provincial rules and regulations that are in conflict with national laws shall be null and void." Thus, under the rule 15 of Kaohsiung city vehicle notice, any injury and loss the passenger suffered in consequence of the transportation should be claimed by Compensation for Death or Injury and Medicare Subsidy of Motor Vehicle Carriage Accident Rules, and not be limited to the maximum compensation amount by that rule.[34]

4.1.2 The Carrier's Liability of Passengers' Luggage or Goods

Luggage or cargo is the item that passenger bring with. The carrier's liability of passengers' luggage or cargo depends on the luggage or cargo is accompanied or not. Accompanied luggage or cargo includes Necklace, jewelry, watches, wallets and document.[35]

4.1.2.1 The Carrier's Liability of Unaccompanied Luggage or Goods

Under Article 657 of Civil Code, "Unless otherwise provided for under this part, the rights and obligation of the carrier for the luggage, which the passenger has entrusted to him, are governed by the provisions concerning Carriage of Goods, even though the carrier did not make a separate charge for it.", and according to the Legislation reasons of Article 654 of the Civil Code, the carrier shall be liable for the rights and obligation of the carrier for the unaccompanied luggage or goods, even though the carrier did not make a separate charge for it to secure the right of passenger. Under the Article 634 of Civil Code, the carrier is liable for any loss, damage or delay in the delivery of the goods entrusted to him, except he can prove that the loss, damage or delay is due to force majeure, or to the nature of the luggage or goods, or to the negligence of the sender or of the consignee.[36] Therefore, the carrier's liability of passenger's unaccompanied Luggage or Goods is based on the strict liability in damage compensation.

In addition, there are some articles about the regulation of unaccompanied Luggage or Goods

[34] Kaohsiung city vehicle notice on land, http://www.taichung.gov.tw/public/attachment/27259352217.doc (accessed 11 Mar., 2013).
[35] Tsong-Juh Chiu [2002]. *Particular kinds of obligations: Part Ⅱ* [pp.556]. Taipei: Angle.
[36] Li Huang [2002]. *Particular kinds of obligations: Part Ⅲ* [pp.346]. Taipei: Angle.

in the Civil Code, under the Article 638 “In the case of loss, damage or delay, the damages shall be fixed in accordance with the value which the goods would have had at the destination and the time when delivery was due. The freight and other expenses which need not be paid in consequence of the loss of or damage to the goods transported shall be deducted from the amount of damages specified in the preceding paragraph. If the loss, damage or delay is due to the intentional acts or gross negligence of the carrier, the sender may also claim for other injuries, if any.” The Article 639, “The carrier is not liable for the loss or damage of the moneys, valuable securities, jewelries or such other valuables, unless he is given notice of the nature and value of such goods when they are entrusted to him. If their value is declared the liability of the carrier is limited to such declared value.” and the Article 640, “Injuries in the case of delay in delivery shall not exceed the amount which could be claimed in case of the total loss of the goods.”

Moreover, under Article 64, Paragraph 1 and 2 of the Highway Act, “In the case of traffic accidents causing injury or death to passengers or other people, or damage or loss to money or property, automobile or trolley transportation providers shall be liable for the damage and compensate for it. However, the providers are not liable to pay damage compensation if it can be proven that the accident was due to force majeure or fault of the shipper or recipient of carried goods. Damage compensation of damaged or lost goods under this article shall up to NTD 3000 per piece unless the shipper has declared and stated clearly about the quality and value of the goods, on the carry agreement before shipping.” The maximum compensation amount of the damage and loss of the unaccompanied luggage or goods which is in consequence of the transportation is NT$3,000 per piece unless the passenger has declared and stated clearly about the quality and value of the luggage or goods, on the carry agreement before the carriage. Besides, under the rule 81 of the motor vehicle transportation management rules, the luggage or goods failed to be delivered over 1 month after the delivery period shall be considered lost by the shipper, and shall request compensations from the carrier, with the exception of those whose reasons for failure of delivery are not attributable to the carrier.

4.1.2.2 The Carrier’s Liability of Accompanied Luggage or Goods

Under Article 658 of the Civil Code, “The carrier is liable for the loss or damage of the luggage caused by his own negligence or that of his employees, even if such luggage has not been entrusted to him by the passenger.” And under Article 220 of the Civil Code, negligence shall be Intentional.[37] The carrier of passenger shall not be held responsible for safekeeping of hand luggage brought on the vehicle by passenger; however, the carrier shall be liable for the damage or loss of the accompanied luggage or goods that was caused by the fault of the carrier or his servants in the transportation, except the delay situation[38]. It would be impropriety if the carrier’s liability of unaccompanied luggage or goods is same as accompanied luggage or goods, thus, the carrier shall not be liable for the damage or loss of the accompanied luggage or goods unless the employer can’t provide proof of non-negligence.[39] Therefore, the carrier’s liability of passenger’s accompanied Luggage or Goods is based on fault principle.

Under Article 658 of the Civil Code, there are mere differences in legal interpretations, one of the opinions is limited the damage compensation to be the same as the damage compensation of passenger’s unaccompanied Luggage or Goods under Article 638 and 639 of the Civil Code.[40] On

[37] Tsong-Juh Chiu [2002]. *Particular kinds of obligations: Part Ⅱ* [pp.557]. Taipei: Angle.
[38] Chun-Tang Liu [2003]. *particular kinds of obligations: Part Ⅱ*[pp.483]. Taipei: Author.
[39] Li Huang [2002]. *Particular kinds of obligations: Part Ⅲ* [pp.346]. Taipei: Angle.
[40] Chun-Tang Liu [2003]. *particular kinds of obligations: Part Ⅱ*[pp.484]. Taipei: Author; Li Huang [2002]. *Particular kinds of obligations: Part Ⅲ* [pp.346]. Taipei: Angle.

the contrary, because of there is not a specific definition of this part to find, thus, under Article 216 of the Civil Code, “unless otherwise provided by the act or by the contract, the compensation shall be limited to the injury actually suffered and the interests which have been lost.” The carrier shall pay the full compensation of the damage or loss. [41]

4.1.3 The Extinctive Prescription of Carrier’s Liability

1. The extinctive prescription of the injured passenger and the delay in the transportation

Under Article 623, Paragraph 2 of the Civil Code, “Claims for damages for injury or delay in the transportation of passengers are extinguished by prescription if not exercised within two years from the date of the ending of the transportation, or from the date when the ending of the transportation ought to have taken place.” The carrier’s liability of the injured passenger and the delay are based on the principle of strict liability. The passenger shall claim for the right in the extinctive prescription period to clarify the stand as soon as possible and in case the carrier bears a heavy liability on.[42] Because of the different character between passengers and cargos, the period of extinctive prescription was remained the same regulation within two years when modified the Civil Code clauses instead of one year.[43] And the starting dates for the claim are as follow[44]:

(1) From the date of the ending of the transportation when the carriage was already finished.

(2) From the date when the ending of the transportation ought to have taken place when the carriage wasn’t finished yet.

2. The extinctive prescription of the damage, loss or delay in the transportation of unaccompanied luggage or goods

Under Article 657 of the Civil Code, unaccompanied luggage or goods applies to the Sub-section 2 Carriage of Goods under the Civil Code. And under the Article 623, Paragraph 1 of the Civil Code, the claims for damages for loss, damage or delay in the transportation of goods are extinguished by prescription if not exercised within one year from the date of the ending of the transportation, or from the date when the ending of the transportation ought to have taken place[45]; while, under Article 54 of the Highway Act, the damage compensations due to loss, damage, or delayed delivery of carried goods shall be shall become invalid if not exercised within one year from the date of payment. According to the special law first is suitable for principle, the Highway Act shall be the prior application, however it would cause the loss of passenger’s right because of the different designated dates to be calculated.

3. The extinctive prescription of the damage, loss or delay in the transportation of accompanied luggage or goods

Though under the Article 623, Paragraph 2 of the Civil Code, “Claims for damages for injury or delay in the transportation of passengers are extinguished by prescription if not exercised within two years from the date of the ending of the transportation, or from the date when the ending of the transportation ought to have taken place.”, while under the Article 623, Paragraph 1 of the Civil Code, “Claims for damages for loss, damage or delay in the transportation of goods are extinguished by prescription if not exercised within one year”, thus, some scholars have the opinion that request claims of the extinctive prescription of the damage, loss or delay in the transportation of accompanied luggage or goods shall become invalid if not exercised within one year as well as the delivery, because the Article 623, Paragraph 2 of the Civil Code isn’t the norm of luggage or

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[41] Tsong-Juh Chiu [2002]. *Particular kinds of obligations: Part Ⅱ* [pp.557]. Taipei: Angle.
[42] Chun-Tang Liu [2003]. *particular kinds of obligations: Part Ⅱ* [pp.486]. Taipei: Author.
[43] Li Huang [2002]. *Particular kinds of obligations: Part Ⅲ* [pp.346]. Taipei: Angle.
[44] Chun-Tang Liu [2003]. *particular kinds of obligations: Part Ⅱ* [pp.486]. Taipei: Author.
[45] Tsong-Juh Chiu [2002]. *Particular kinds of obligations: Part Ⅱ* [pp.558]. Taipei: Angle.

goods. [46]However, there is no clear regulation of the claim right for accompanied luggage or goods under the Civil Code. Furthermore, there is also no rule to be applicable to the Sub-section 2 Carriage of Goods under the Civil Code. For the above reasons, some scholars have the opinion that it shall be applicable to the Article 125 of the Civil Code, the general extinctive prescription, "Unless shorter periods are provided by the act, a claim is extinguished by prescription if it is not exercised within fifteen years." Nevertheless, due to the legislation reasons of the carriage of goods and passengers under the Civil Code, the shorter periods are provided to secure the right of passenger, our study hold an opinion that it shall to be applicable to the two years extinctive prescription under Article 623, Paragraph 2 of the Civil Code, in order to claim the right as soon as possible to secure the right of passenger and to unify the regulation of luggage or goods in a contract.[47]

4.1.4 The Limited of Liability Exemption

The contract of carriage is usually a contract in which articles for standard contracts fully or partially is contracts prepared by business operators.[48] Generally speaking, the terms and conditions used in the standard contracts by the business operators shall be based on the principles of equality and reciprocity instead of setting inequality of treatment in the contract and where the terms and conditions of standard contracts are ambiguous, interpretations shall be made favorable to the consumers.[49] However, there are some terms and conditions in standard contracts include those which can be shown on public screens, flyers, public message boards, the Internet, or other methods violate the principle of good faith and are conspicuously unfair to consumers.[50] Therefore, under Article 659 of the Civil Code, "A statement in a ticket, receipt or other document delivered by the carrier to the passenger, excluding or limiting the liability of the carrier, is ineffective, unless it can be proved that the passenger expressly agreed to such exclusion or limitation of liability." The contract of carriage shall be effective if it can be proven that passenger have expressed consent instead of implied consent to such exclusion or limitation of carrier's liability.[51] However, the exclusion or limitation of carrier's liability shall be limited under Article 222 of the Civil Code, "Responsibility for intentional or gross negligent acts shall not be released in advance."[52]

4.2 The Regulations of Amphibious Vehicle in Water

4.2.1 The Carrier's Liability of Passengers

4.2.1.1 The Liability Principle

There is no specific regulation of the carrier's liability of passengers under the Maritime Act. However, it would be a question whether it is appropriate to be applicable to Article 79 of the Maritime Act, "Unless otherwise provided in this Section, the provisions of Section I of this Chapter apply mutatis mutandis to the carriage of passengers." , or not. In addition, there is a great different between the nature of passenger and cargo, and also the exclusion or limitation of carrier's liability under Section I, Carriage of Cargo, of the Maritime Act, which is apparently unfair to passengers.[53] Therefore, it would be propriety to be applicable to Article 5 of the Maritime Act, "The maritime

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[46] Tsong-Juh Chiu [2002]. *Particular kinds of obligations: Part Ⅱ* [pp.559]. Taipei: Angle; Chun-Tang Liu [2003]. *particular kinds of obligations: Part Ⅱ* [pp.486]. Taipei: Author.

[47] Hui-Ting Liu[2010]. *A study on the sea carrier's liability in the cross-strait passengers direct transportation* [pp.28]. Program of National Science Council, Kaohsiung.

[48] Chun-Tang Liu [2003]. *particular kinds of obligations: Part Ⅱ* [pp.485]. Taipei: Author.

[49] Li Huang [2002]. *Particular kinds of obligations: Part Ⅲ* [pp.331]. Taipei: Angle.

[50] Chun-Tang Liu [2003]. *particular kinds of obligations: Part Ⅱ* [pp.485]. Taipei: Author.

[51] Li Huang [2002]. *Particular kinds of obligations: Part Ⅲ* [pp.331]. Taipei: Angle.

[52] Attorney Jheng [2006]. *particular kinds of obligations* [pp.17-17]. Taipei: Get.

[53] Yu-Hsien Liang [2005]. *Commercial Law* [pp.480]. Taipei: ChinJin.

matters shall be subject to regulations of this Code; anything not regulated in this Code shall be subject to the provisions laid out in the other Laws.", instead of Article 79 of the Maritime Act. On account of the above reasons, the carrier's liability of passengers in water including the liability principle, the damage compensation amount and the claim extinctive prescription are the same as the carrier's liability of passengers on land. Please refer to chapter 4.1.

4.2.1.2 The extinctive prescription of the damage, loss or delay in the transportation of unaccompanied luggage or goods

There is an opinion that the nature of luggage is different from the nature of cargo, therefore, it would be appropriate to set new clause for the luggage in water.[54] However, the luggage and cargo are all goods, shall be entrusted to the carrier for a carriage and be husbanded by the carrier, even though the carrier did not make a separate charge for it. Under Article 657 of the Civil Code, "Unless otherwise provided for under this part, the rights and obligation of the carrier for the luggage, which the passenger has entrusted to him, are governed by the provisions concerning Carriage of Goods, even though the carrier did not make a separate charge for it, it seems that the Civil Code regards there is a common ground between entrusted luggage and cargo. However, being applicable to the regulation under Sub-section 2 Carriage of Goods of the Civil Code would overpass the different nature from land transport to marine transport.[55] According to the different risk character on land or water route, our study has an opinion that the entrusted luggage by shipment shall be applicable to the regulation under Section I, Carriage of Cargo, of the Maritime Act instead of the Sub-section 2 Carriage of Goods of the Civil Code. Therefore, the carrier's liability of the loss, damage or delay in the delivery of the luggage or goods is based on the principle of Presumed Negligence.[56]

Under Article 5 of the Maritime Act, the damage compensation following the Article 638 of the Civil Code shall be claimed in accordance with the value which the goods would have had at the destination and the time when delivery was due. Moreover, under Article 70 of the Maritime Act, "Unless the nature and value of the cargo have been declared by the shipper before shipment and inserted in the bill of lading, neither the carrier nor the shipowner shall be liable for any damage to or loss of the cargo in an amount exceeding 666.67 Special Drawing Rights per package or 2 Special Drawing Rights per kilogram, whichever is the higher.", and the rule 144 of The Regulations for Administrating Passenger Ship, "When checking luggage for carriage, passengers may declare the amount of compensation for damage or loss, if any, and the shipowner or carrier may levy and collect additional charge for the value declared.", consequently, if the nature and value of the cargo haven't been declared by the shipper before shipment and inserted in the bill of lading, the carrier shall assert the above-mentioned right to limit the damage compensation, except the responsibility for intentional or gross negligent acts.

To the claim of damages, under Article 56, Paragraph 2 of the Maritime Act, the carrier and the shipowner shall be discharged from all liability in respect of the damage or loss either totally or partly, of the luggage unless suit is brought within one year of their delivery or of the date when they should have been delivered.", one year is the limitation period of actions for passenger to bring a suit. However, under Article 151, Paragraph 2 of The Regulations for Administrating Passenger Ship, The right of claim of the person entitled to the luggage for damage shall be exterminated if such

[54] Attorney Liu [2006]. *Case of Maeitime Law* [pp.289]. Taipei: Get.
[55] Hui-Ting Liu[2010]. *A study on the sea carrier's liability in the cross-strait passengers direct transportation* [pp.25]. Program of National Science Council, Kaohsiung.
[56] Number 2482verdict year 2009, Taiwan High Court. Number 1403 verdict year 2004, Taiwan High Court. Number 122 verdict year 2002, Taiwan High Court.

right is not executed within one year after the day of delivery or the day on which the delivery should be made, the extinctive prescription of carrier's liability shall be one year. In this case, the Maritime Act is a statute while The Regulations for Administrating Passenger Ship is an ordinance, therefore, under Article 11 of the Central Regulation Standard Act, "An ordinance shall not be inconsistent with the Constitution or a statute.", the claim period of damages shall be the limitation of one year.

4.2.1.3 The Carrier's Liability of Accompanied Luggage or Goods

The nature of accompanied Luggage or Goods is different the cargo which is entrusted to carrier and be husbanded by him, therefore, under Article 5 of the Maritime Act, the Civil Code shall apply mutatis mutandis to the Accompanied Luggage or Goods, instead of the Section I, Carriage of Cargo, of the Maritime Act. On account of the above reasons, the carrier's liability of accompanied Luggage or Goods in water, including the liability principle, the damage compensation amount and the claim extinctive prescription shall be the same as the carrier's liability of passengers on land. Please refer to chapter 4.1.

4.2.1.4 The Limitation of Shipowners' Liability

There is a limitation of shipowners' liability under the Article 21, Paragraph 1, Section 1 of the Maritime Act, The liability of the carrier is limited to an amount equal to the value of the ship, the freight and other accessories of the particular voyage in respect of the claims of the loss of life, personal injury or loss of or damage to property, occurring on board or with the operation of the ship or salvage operations directly resulting therefrom. The carrier has the right to assert the preceding regulation of the limitation of shipowners' liability.[57] If the sum of limitation of liability under the preceding paragraph 1 which the amount equal to the value of the ship, the freight and other accessories of the particular voyage, is less than the following, the shipowner shall be liable for the deficit:

1. Where the occurrence has given rise to property claims, an aggregate amount of 54 Special Drawing Rights(SDR) as defined by the International Monetary Fund for each ton of the ship's registered gross tonnage(GRT).

2. Where the occurrence has given rise to loss of life or personal injury claims, an aggregate amount of 162 SDR for each GRT.

3. Where the occurrence has given rise both claims in the preceding two paragraphs, an aggregate amount of 162 SDR for each GRT, of which a first portion amounting to 108 SDR for each GRT shall be exclusively appropriated to the payment of personal claims in respect of loss of life or personal injury, and of which a second portion amounting to 54 SDR for each GRT shall be appropriated to the payment of property claims: Provided however that in cases where the first portion is insufficient to pay the personal claims in full, the unpaid balance of such claims shall rank rateably with the property claims for payment against the second portion of the fund.

4. The GRT of a ship of less than 300 tons shall be deemed to be 300 tons.

Therefore, the carrier has the right to assert the preceding regulation of the limitation of shipowners' liability to the request claims of the extinctive prescription of the damage, loss in the transportation of passenger and goods.

4.3 Comparison of the Law between on Land and In Water

The comparisons of the law between on land and in water for the carrier's liabilities of

[57] Gwo-Hshiung Tzeng, Chih-Ching Chang [2008]. *Maritime Law* [3nd ed.] [pp.261]. Taipei: Pacificstargroup.

passengers, unaccompanied and accompanied luggage or goods refer to table 5, 6, and 7. After the comparisons, the carrier's liability on land and in water are similar because of the water route usually apply mutatis mutandis to the regulation of the Civil Code. However, there is a difference in the carrier's liability of unaccompanied luggage or goods. In addition, there is a special rule that the carrier has the right to assert the preceding regulation of the limitation of shipowners' liability.

Table 4 A comparison sheet of the carrier's liability of passenger between on land and in water

	On land	In water
Liability principle	Based on the strict liability (Article 654 of the Civil Code; Article 64, Paragraph 1 of the Highway Act)	Same as on land(Article 5 of the Maritime Act)
Exception	(1) The injury or is due to the negligence of such passenger (2) The injury is due to force majeure (Article 654 of the Civil Code; Article 64, Paragraph 1 of the Highway Act)	Same as on land(Article 5 of the Maritime Act)
Damage compensation	The delay of carriage: full compensation of the damage or loss (Article 216 of the Civil Code) (Under the Compensation for Death or Injury and Medicare Subsidy of Motor Vehicle Carriage Accident Rules, The maximum compensation amount of death: NT$2,500,000; serious injure: NT$1,400,000; injure: NT$400,000. The compensation would not be limited in the preceding amount if the person who has proof of the claim for higher compensation of the loss.) The delay of carriage： (1) Due to force majeure：the increased necessary expenses paid by the passenger due to the delay of the transportation (Article 654, Paragraph 2 of the Civil Code) (2) Not due to force majeure： full compensation of the damage or loss (Article 216 of the Civil Code)	Same as on land(Article 5 of the Maritime Act)
Period of time	Negative prescription: 2 years (Article 623, Paragraph 2 of the Civil Code)	Same as on land(Article 5 of the Maritime Act)

Source: Compilation of this study.

Table 5 A comparison sheet of the carrier's liability of unaccompanied Luggage or Goods between on land and in water

	On land	In water
Liability principle	Based on the strict liability (Article 634 of the Civil Code; Article 64, Paragraph 1 of the Highway Act)	Based on the principle of Presumed Negligence (applicable to the Carriage of Cargo under the Maritime Act)
Exception	(1)Due to force majeure (2) The nature of luggage (3)The negligence of such passenger (Article 634 of the Civil Code; Article 64, Paragraph 1 of the Highway Act) (4)unnoticed value of luggage (Article 639 of the Civil Code)	For instance, article 69, Section 17, Article 70, Paragraph 1, Article 71 of the Maritime Act)
Damage compensation	(1) The value which the goods would have had at the destination and the time when delivery was due (Article 638 of the Civil Code) (2)The value declared by the shipper before shipment (Article 639, Paragraph 2 of the Civil Code) (3) Injuries in the case of delay：not exceed the amount which could be claimed in case of the total loss of the goods (Article 640 of the Civil Code) (4) In the case of traffic accidents: up to NTD 3000 per piece (Article 64 of the Highway Act)	(1)The value which the goods would have had at the destination and the time when delivery was due (under Article 5 of the Maritime Act, be applicable to the Article638 of the Civil Code) (2)unnoticed value of luggage and not inserted in the bill of lading：in an amount exceeding 666.67 Special Drawing Rights per package or 2 Special Drawing Rights per kilogram, whichever is the higher (Article 70, Paragraph 2 of the Maritime Act) (3) the value declared by the shipper before shipment
Period of time	Negative prescription: 1 year (Article 623, Paragraph 1 of the Civil Code)	Statute of limitation: 1 year (Article 56, Paragraph 2 of the Maritime Act)

Source: Compilation of this study.

Table 6 A comparison sheet of the carrier's liability of accompanied Luggage or Goods between on land and in water

	On land	In water
Liability principle	based on fault liability principle (Article 658 of the Civil Code)	Same as on land(Article 5 of the Maritime Act)
Exception	Delay	Same as on land(Article 5 of the Maritime Act)
Damage compensation	Opinion(1)Up to the standard of unaccompanied Luggage or Goods Opinion(2) Full compensation of the damage or loss	Same as on land(Article 5 of the Maritime Act)
Period of time	Opinion(1) Negative prescription: 1 year Opinion(2) Negative prescription:2 years	Same as on land(Article 5 of the Maritime Act)

Source: Compilation of this study.

4.4 The Liability of the Amphibious Vehicle Contract in Kaohsiung

There are two route choices in this tour. One is the Lotus Pond Route stop which is located in Kaohsiung Products Stores and sails in Lotus Pond. The other one is Love River Route stop which are located in Dream mall on weekday and Pier-2 Art Center on weekend and sails in Love River. Under article 1 of the Maritime Act, "The term "ship" referred to in this Code shall denote any ship that navigate on the sea, or navigate on the surfaces of or in the waters accessible to the sea.", amphibious vehicle is the term "ship" of the Maritime Act when sailing on the Love River where accessible to the sea, while it isn't when sailing in a lake, Lotus Pond that isn't accessible to the sea. Thus, the amphibious vehicle sailing in Lotus Pond is not applicable to this Code, save for those involved in a matter of collision. Under Article 3 of the Maritime Law, "The ships listed as below are not applicable to this Code, save for those involved in a matter of collision: 1. Small ships, as termed under the Law of Ships. 2. Ships that are intended for Military Naval use. 3. Ships that are only for government official use. 4. Any other Ships not falling the stipulation of Article 1 of this Code.", and under Article 3, Section 1 of The Law Of Ships, ""Small ship" refers to a non-power-driven ship of under fifty (50) gross tonnage, or a power-driven ship of under twenty (20) gross tonnage." However, the current amphibious vehicle owned by Kaohsiung City Bus Service Administration is a 19.5 gross tonnage power-driven ship which is the "Small ship" referred to in The Law Of Ships instead of the "ship" referred to in Maritime Law. Thus, the current two amphibious vehicles owned by Kaohsiung City Bus Service Administration are not applicable to this Code, save for those involved in a matter of collision. Besides, there is no service provided by the amphibious vehicle in Kaohsiung for passenger to entrust his luggage or goods to the carrier. Therefore, there is no regulation about unaccompanied luggage or goods.

However, in case of importing or creating an amphibious vehicle of upper twenty (20) gross tonnage amphibious vehicle and sailing in water where accessible to the sea that conform to the term "ship" of the Maritime Act shall be applicable. Besides, when it drives on the land shall be applicable to the regulation of land as the preceding analysis.

There is only a ticket in the amphibious vehicle of carriage without any contract done in writing. The carrier's liability of the amphibious vehicle referred to in the back of the ticket is a notice "Passengers can refund the tickets 20 minutes before the scheduled departure time should any natural disaster or irresistible force occurs.", which doesn't mention about the indemnification rule of the loss of passengers, delay in the transportation or the damage of the luggage and also isn't against the rule of the Civil Code or the Maritime Act. Thus, this notice shall be valid and it's a

termination term of contract.

Besides, the amphibious vehicle, for those involved in a matter of collision, shall be applicable to the Chapter Iv：Collision Of Ships of the Maritime Act under Article 3 and 94 of the Maritime Act as follow:

1. Where a collision is caused by force majeure, the injured party is not entitled to claim for damages arising therefor. (Under Article 95 of the Maritime Act.)

2. Where a collision is caused by the fault of one of the ships involved, the one in fault shall be liable for the damages therefor. (Under Article 96 of the Maritime Act.)

3. If the colliding ships are all in fault, each ship shall be liable in proportion to the extent of its faults; If it is not possible to ascertain the degree of the respective faults, the liability is apportioned equally amongst the parties involved. The ships at fault shall also be jointly and severally liable for the loss of life or personal injury caused therefor. (Under Article 97 of the Maritime Act.) And under Article 99 of the Maritime Act, “The claim arising out of a collision shall be extinguished if not duly exercised within two years commencing from the date of collision.” In addition, it shall also be applicable to the Civil Code in tort for those involved in a matter of collision.

5. CONCLUSION

Amphibious vehicle carriage not only can drive on road but also sail in water, providing an entertainment of combined transport for tourist. Our study defines this kind of transport way as a combined transport. However, there is not a clear definition of the contract of amphibious vehicle carriage under Taiwan law. Therefore, according to the different risk character on land and in water, different portion of tour shall be applicable to different regulations of law. Driving on the road portion of tour shall be applicable to the Civil Code and Highway Act while sailing in the water portion shall applicable to Maritime Act. However, under Article 1 and 3 of the Maritime Act, to be applicable to the Maritime Act, a power-driven ship shall upper twenty gross tonnage and sailing on the sea or the water route where accessible to the sea. Therefore, the carrier’s liability of amphibious vehicle carriage shall be different by the gross tonnage of the vehicle as following:

1.The amphibious vehicle upper twenty (20) gross tonnage

The amphibious vehicle upper twenty (20) gross tonnage shall be applicable to Maritime Act when sailing in the sea or water where accessible to the sea and be applicable to the Civil Code and the Highway Act when driving on road. Base on the preceding analysis, for lack of Carriage Of Passengers regulation under the Maritime Act, the carrier’s liability of the injured passenger and the damaged or lost accompanied luggage or goods in both the road and the water portion of the carriage are applicable to the Civil Code. on the contrary, the carrier’s liability of unaccompanied luggage or goods on the road portion shall be applicable to the Civil Code. under the Civil Code, in the case of the damage or loss, the damages shall be fixed in accordance with the value which the luggage or goods would have had at the destination and the time when delivery was due. Under Article 64 of the Highway Act, damage compensation of damaged or lost luggage or goods under this article shall up to NTD 3000 per piece. The claims for damages for loss, damage or delay in the transportation of goods are extinguished by prescription if not exercised within one year. The carrier’s liability of unaccompanied luggage or goods in the water portion shall be applicable to the Maritime Act. Under the Maritime Act, the regulation of the damage compensation is the same as on road rule. Nevertheless, the carrier shall be liable for any damage to or loss of the luggage or goods in an amount exceeding 666.67 Special Drawing Rights per package or 2 Special Drawing Rights per

kilogram, whichever is the higher and shall also be discharged from all liability in respect of the damage or loss either totally or partly, of the luggage unless suit is brought within one year.

Moreover, in the specific case of the injured, damage or loss in the water portion of the carriage, the carrier has the right to assert the limitation of shipowners' liability to the request claims of the damage compensation.

2.The amphibious vehicle under twenty (20) gross tonnage

The current amphibious vehicle of Kaohsiung city is a 19.5 gross tonnage small ship referred by the Law of Ships. Thus, it is not applicable to the Maritime Act. The carrier's liability in both the road and the water portion of the carriage are applicable to the Civil Code. However, the road portion is also applicable to the Highway Act. Besides, there is no service provided by the amphibious vehicle in Kaohsiung for passenger to entrust his luggage or goods to the carrier. Therefore, there is no regulation about unaccompanied luggage or goods. Moreover, the carrier may liable for larger liability because he can't be applicable to the limitation of shipowners' liability for the claim of accident. In addition, whether vessels sailing in the sea or the water where accessible to the sea or not, those involved in a matter of collision shall be applicable to the Maritime Act. Thus, the amphibious vehicle sailing in Lotus Pond where isn't accessible to the sea is not only applicable to the Maritime Law but also applicable to the Civil Code in tort for those involved in a matter of collision.

3.Case of the fatal accident

In this accident, improper safety management issues were identified a big problem include the uncompleted vehicle maintenance, using of cell phones by crewmembers on duty, failing for maintaining an effective lookout, and the reckless response to the emergency caused the fatal, injured of passenger and a great loss of property. Under the U.S. Code, the limitation of shipowners' liability shall apply to all seagoing vessels, and also to all vessels used on lakes or rivers or in inland navigation, including canal boats, barges, and lighters if the shipowner could show that he had no knowledge of or participation in the negligent act that resulted in the loss. However, the current amphibious vehicle of Kaohsiung city isn't the ship under the maritime Act, thus, the carrier may liable for larger liability because he is not applicable to the limitation of shipowners' liability under the Maritime Act for the claim of accident.

Nevertheless, our study is not focusing on the rule of safety policy of the amphibious vehicle. However, the number of people with eyes glued to the screen of 3C products is growing in recent years that may cause a distracted driving that threatens the safety of passengers. Therefore, we shall also respect the safety policy of the vehicle, including personnel training, emergency procedures, driving regulation and maintenance procedures shall be prepared and implemented. In addition, the carrier shall adequately convey to the passengers the critical information they needed to be prepared to respond effectively to any emergency before the tour. The amphibious vehicle of carriage would provide a safer service for passengers to take. Thus, it is a necessary issue about the regulation of safety carriage.

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GIS-based approach for Potential Runoff Coefficient Determination A Case Study of Upper Soyang Watershed

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ABSTRACT: The study is an application of GIS hydrology field. The study area is upper Soyang watershed of which, potential runoff coefficient is derived based on landcover, hydrological soil group and slope. It has been found that, the runoff is constant for near zero slope whereas approaches 1 in high slopes. The study demonstrates that PRC for ungagged watershed can be derived and thus might help in runoff estimation.

1. INTRODUCTION

The problem of estimating runoff from a storm event is one of the key points in hydrologic modeling. Estimating runoff is an important tool for planning of natural resources management and implement management strategies more sustainable in the long-term. Many physically based process model are developed for runoff estimation which require more cost and time effort. The derived rainfall-runoff relations from these observed watersheds are applied as an empirical or statistical approach to similar unmonitored watersheds where runoffs are to be estimated. One of the simplest runoff estimates is a function of rainfall, and a runoff coefficient that accounts for losses due to interception, infiltration, storage etc. Another type estimates runoff as a function of runoff depth and catchment area (Mitchell et al., 2001).

The runoff coefficient of a grid or catchment is the ratio of runoff volume to rainfall volume. It can be defined either as the ratio of total depth of runoff to total depth of rainfall, or as the ratio of peak rate of runoff to rainfall intensity for the time of concentration (Wanielista and Yousef, 1993). It can be used in event-based derived flood frequency models for estimating flood occurrences from rainfall frequencies (Sivapalan et al., 2005).A runoff coefficient varies under varying landcover, soil type and slope (Liu et al., 2004). Hence, the effects of seasonal variation, forest harvesting, landslide (slope variation) etc. should be considered (Tedela, 2009).

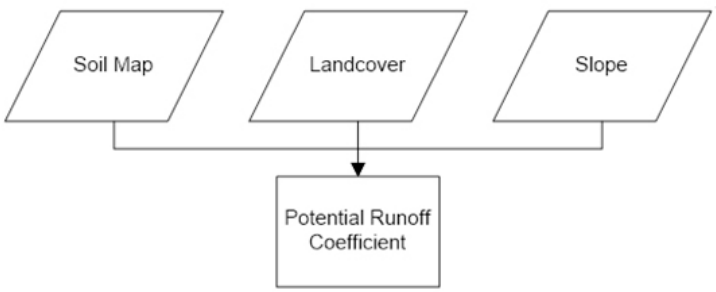

Figure 1: Conceptual framework

The main objective of the study work is to predict the potential runoff coefficient for upper Soyang watershed, South Korea based on GIS on the basis of landcover, slope and soil type.

2. DATA AND METHODOLOGY

The research work is an application of hydrological models in GIS framework. The primary database is established on the basis of three principle base maps: DEM, Landcover and Soil type map. All other necessary secondary input maps can be derived from them.

The entire data used for this study are available at free of cost. Graphical analysis i.e. map works were done on ArcGIS 9.2 and rest calculation were performed using MS-Excel. The methodology was adopted from a GIS-based distributed watershed model, WetSpa Extension for ArcView (Liu et al., 2004). The conceptual framework is shown in figure 1.

2.1 Area of Study

Soyang River is located in Gangwon province. The study area is upper basin of Soyang. The latitude and longitude of the study area are 37°40'57.88"N - 38° 6'14.01"N and 128° 9'35.04"E - 128°35'37.15"E respectively. The basin under study has a drainage area of 1083.59 square km, perimeter of 178.64 km, and a channel length of 85.18km long and average width of 12.72km. The location map is shown in figure 2.

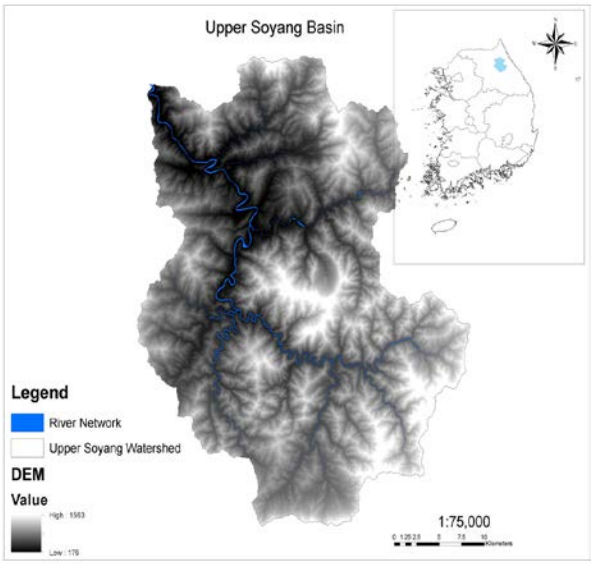

Figure 2: Loction Map of the study area

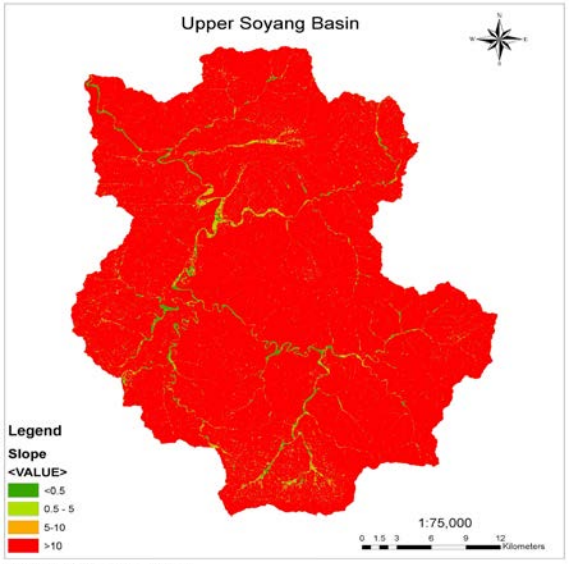

Figure 3: Slope map

2.2 Digital Elevation Model

For the study, Digital Elevation Model (DEM), with a spatial resolution of 30m based on ASTER, has been obtained from USGS Global Visualization Viewer (GloVis, http://glovis.usgs.gov). The watershed ranges from 179m to 1563 m. The DEM were filled to remove any sinks and maintain the

continuity of flow towards the outlet. Secondary maps like slope, watershed area, stream network etc. were derived from it. The slope map was reclassified into 4 categories as: <0.5%, 0.5-5%, 5-10% and >10% (figure 3). It can be seen that the whole area except floodplain is very steep in nature which cause more surface runoff and more sediment transport (Liu et al., 1994).

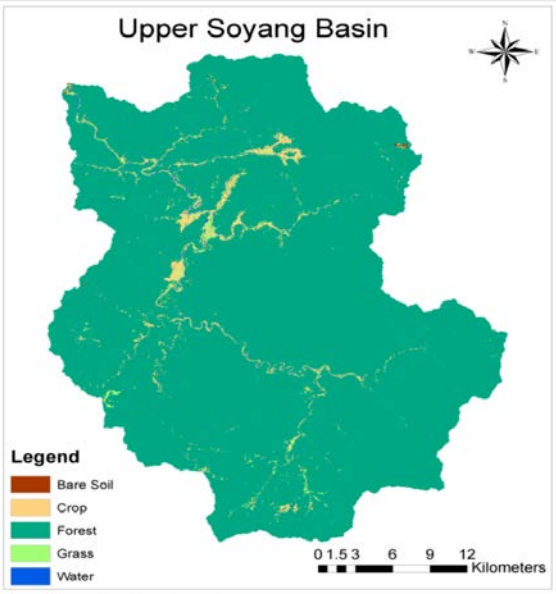

Figure 4: Landuse map

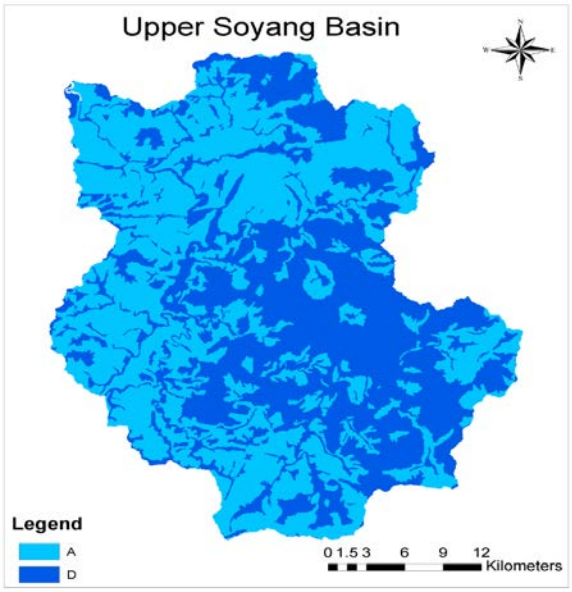

Figure 5: Hydrological Soil Group map

2.3 Landcover Map

The landcover map of the Soyang watershed for the year 2000 was obtained from Water Management Information (WAMIS, http://wamis.go.kr/), Korea. It was 30m resolution map derived from Landsat 7 ETM. The study area was clipped from it for the study (Fig: 4) with the help of watershed derived from DEM. The study area is basically a forested watershed with forest coverage of more than 96% drainage area (Table: 1). The landuse was classified into forest, grass, crop, bare soil and water (impervious area).

Landcover	Area (sq.km.)	Percentage
Forest	1048.24	96.74
Grass	7.51	0.69
Crop	25.50	2.35
Bare Soil	0.62	0.06
Water	1.73	0.16
Sum	1083.59	100.00

Table 1: Landcover of the study area

2.4 Soil Map

According to FAO-UNESCO Digital Soil Map of the World v3.6 (FAO, http://www.fao.org/geonetwork/srv/en/metadata.show?id=14116), the study area falls under lithosol soil type. Most of the parts are either rocky outcrops or loamy sand. The soil group was taken from NAIST report where the rock outcrops are categorized under group D and the rest loamy sand area in group A (Hong et al., 2006).

3. POTENTIAL RUNOFF COEFFICIENT

First of all runoff coefficients were collected from the WetSpa manual and a table was generated, linking values of the runoff coefficient to slope groups, soil type and land-use classes derived above. These values were collected from literatures (Kirkby, 1978; Chow et al., 1988; Browne 1990 & Fetter, 1980) and adjusted after Mallants and Feyen (1990) by the developer (Table 2). The potential runoff coefficients for impervious (including open water surface and wetland) are set to 1.

Reclassified Landuse	Hydrological Soil Group			
	A		D	
	C0	S0	C0	S0
Forest	0.1	0.62	0.27	0.47
Grass	0.2	0.522	0.37	0.376
Crop	0.3	0.442	0.47	0.296
Bare Soil	0.4	0.365	0.57	0.229
Impervious	1	0	1	0

Table 2: Potential Coefficient and slope constant (Liu et al., 2004)

In order to estimate the potential runoff coefficient on the basis of a continuous slope, a simple linear relationship between potential runoff coefficient and surface slope is used, which can be described as:

$$C = C0 + (1 - C0)\frac{S}{S+S0} \quad (1)$$

where C is the potential runoff coefficient for a surface slope S (%), C0 is the potential runoff coefficient constant for a near zero slope corresponding to the values listed on the Table 2 for each land use. Similarly, S0 (%) is a slope constant for different land use and soil group combinations, as listed in same table 2 above.

The influence of urban areas to the storm runoff is self-evident. Due to the grid size, cells may not be 100% impervious in reality. Here the urban area is very small compared to forest remaining area is assumed to be pervious and covered by grass, and therefore, the potential runoff coefficient for urban areas is considered as grass in the study.

4. RESULTS

First of all the maps were reclassified with weighted value, then they were combined in one map with different categories (figure 6). The different classes were revalued with their constants to derive maps for C0 and S0. Using the relationship of 1, Potential runoff constant map was derived (figure 7).

The graphs above show the potential runoff coefficient for HSG A (left) and group D (right), of random sample points taken from forest area for different slope range and fitted power regression. It can be seen that, the potential runoff coefficient approaches to C0 when slope is very small and 1 when slope is infinite. These graphs also show that the changing magnitude of potential runoff coefficient is decreasing along with the increasing of surface slope. This conforms that the runoff volume for a certain amount of rainfall is less or even not affected by slope beyond a critical slope (Sharma, 1986).

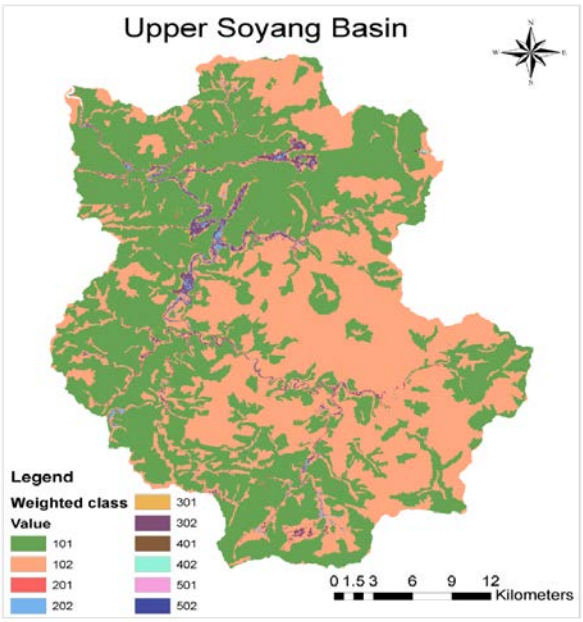

Figure 6: Reclassified Weighted Class

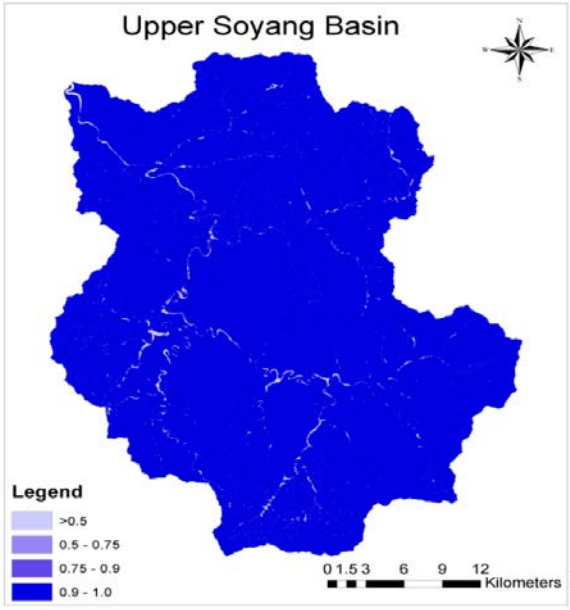

Figure 7: Potential Runoff Cofficient

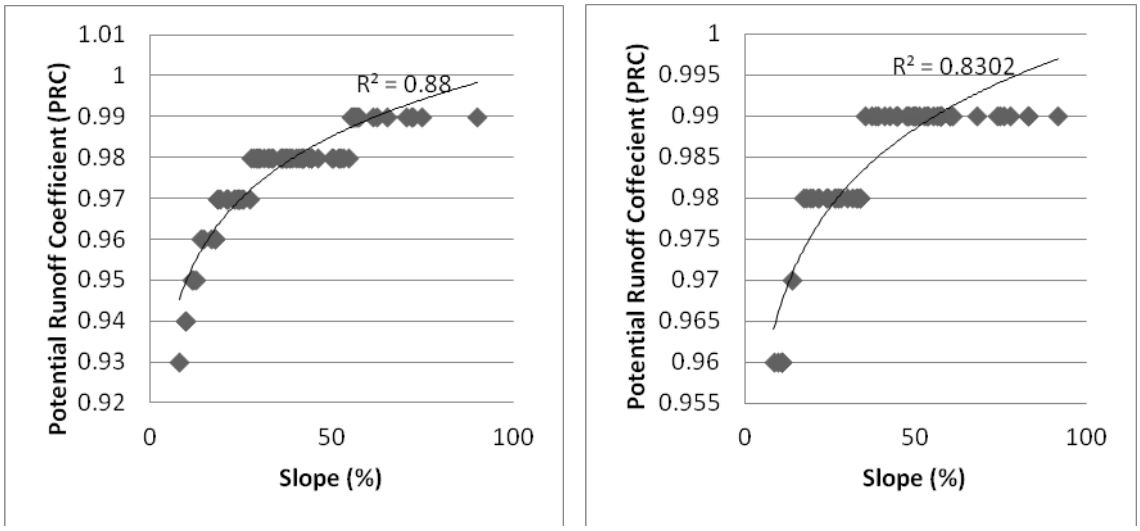

Figure 8: Potential runoff coefficient Vs. Slope for forest in Hydrological soil group A

5. CONCLUSION AND RECOMMENDATION

The study demonstrates that Potential Runoff Coefficient for ungagged watershed can be derived and thus might help in runoff estimation calculation. In this study, the upper Soyang is main

source of runoff for Soyang Lake, is mostly forested watershed which generates 90 % of runoff through rainfall. Also, the relation of higher slope towards 1 PRC is also found. The study can be extended into next level by calculating runoff for certain fall event and validate by field measurement of runoff for different small sample catchments.

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Research on the Service of the Shared Taxi in Hasami Town of Nagasaki Prefecture

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ABSTRACT: The test operation of the Shared Taxi started in October, 2011 in Hasami Town of Nagasaki Prefecture, and full-scale operation has been carried out from April, 2012. In this study, we acquired the data from April, 2012 to October, 2013 and examined the service situation. As a result, we extracted the problems that became clear.

1. INTRUDUCTION

Hasami Town is located in the prefectural boundary with Saga Prefecture (Figure 1). The route bus which was operated in many routes in the past have withdrawn by decreasing of passengers. In such situation, it is very important to remove traffic blank areas in mountainside where a route bus does not operate.

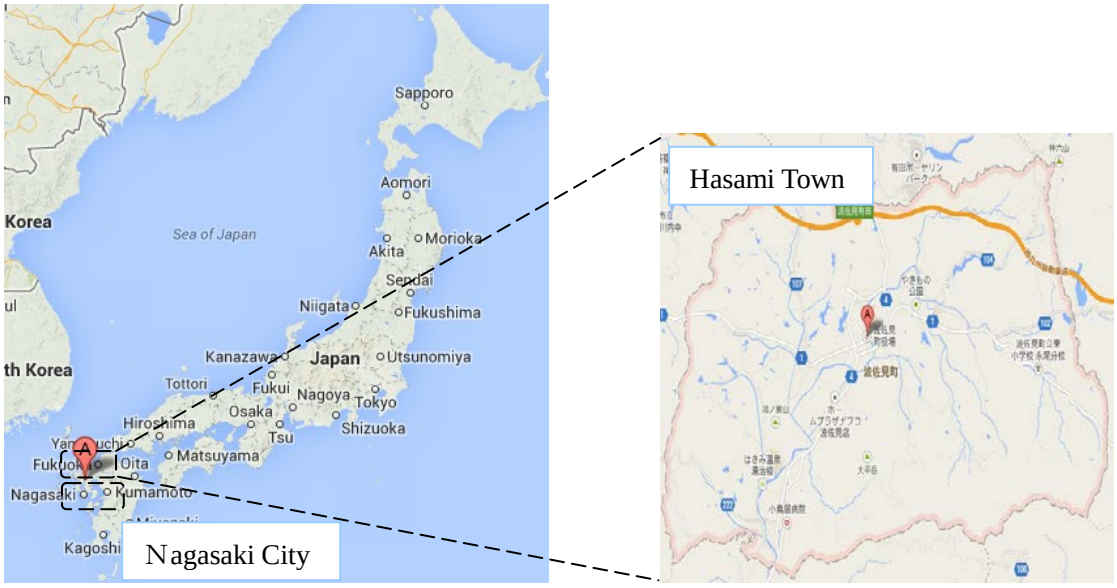

Figure 1Research location

2. THE SERVICE SITUATION

In this study, we investigated 12 routes of the shared taxi based on data and maps provided by Hasami Town government office, and grasped the service situation of the shared taxi. In addition, we interviewed about the service situation such as the number of users, the income and expense for the service, etc. of the shared taxi. Furthermore, we analyzed these data and clarified the problems.

The test operation of the Shared Taxi started in October, 2011 in Hasami Town, and full-scale operation with the reservation system has been carried out from April, 2012. The service method and the service contents are shown in Table 1. Hasami Town office consigned the service of the Shared Taxi to two taxi companies (Sohgo Taxi and Mayumi Taxi), and these companies have provided the service the Shared Taxi.

The Shared Taxi has been operated in 12 routes which start from Syuku Station located in the central area of this town. This taxi has been operated with a reservation system, and 120 bus stop are set. A fare of an adult from any stop to Syuku Station is 200 yen (100 yen for a child). The operations have been performed three round-trips in a day, two times a week as shown in Table 1. Figure 2 shows the taxi stops of the Sharing Taxi.

Table 1 Running routes

Area	Running company	Name	Time table		Running Times per week	Running Times per day
East area	Sohgo Taxi	Nakaoyumuta-line	Mon.	Wed.	Two times per week	Three round-trips in a day
		Mitsunomata-line	Wed.	Fri.		
		Kodaru-line	Tue.	Fri.		
		Nonokawa-line	Mon.	Thu.		
		Onikiiseki-line	Tue.	Thu.		
		Kanaya-line	Wed.	Fri.		
South area	Mayumi Taxi	Higashitohge-line	Tue.	Fri.	Two times per week	Three round-trips in a day
		Sarayama-line	Wed.	Fri.		
		Kawauchitanokashira-line	Mon.	Wed.		
		Shiori-line	Tue.	Thu.		
		Uchinonami-line	Wed.	Fri.		
		Muraki-line	Mon.	Thu.		

Figure 2 Stops of the Sharing Taxi

3. THE CHANGE OF THE NUMBER OF USERS

Figure 3 shows the change of the number of total users of the Shared Taxi during April, 2012 to October, 2013. Comparing the number of users of each month of 2013 with 2012, it is clear that the number of users in 2013 exceeds 2012 from Figure 3. Figure 4 shows the number of users of the Shared Taxi in each route during April, 2012 to October, 2013. According to Figure 4, the routes where the number of users were large in 2013 were Onigiiseki-line, Nonokawa-line, and Nakaoyumuta-line. The number of users of the Onigiiseki-line was the maximum of all routes, and that was 283. Table 2 shows the number of population and household in Hasami Town in November, 2013. According to Table 2, the population of Iseki-go and Onigi-go which are located near Onigiiseki-line occupies only approximately 5% of whole town. Therefore, we think that the number of users of the Shared Taxi is not related directly to the population of the area along the route.

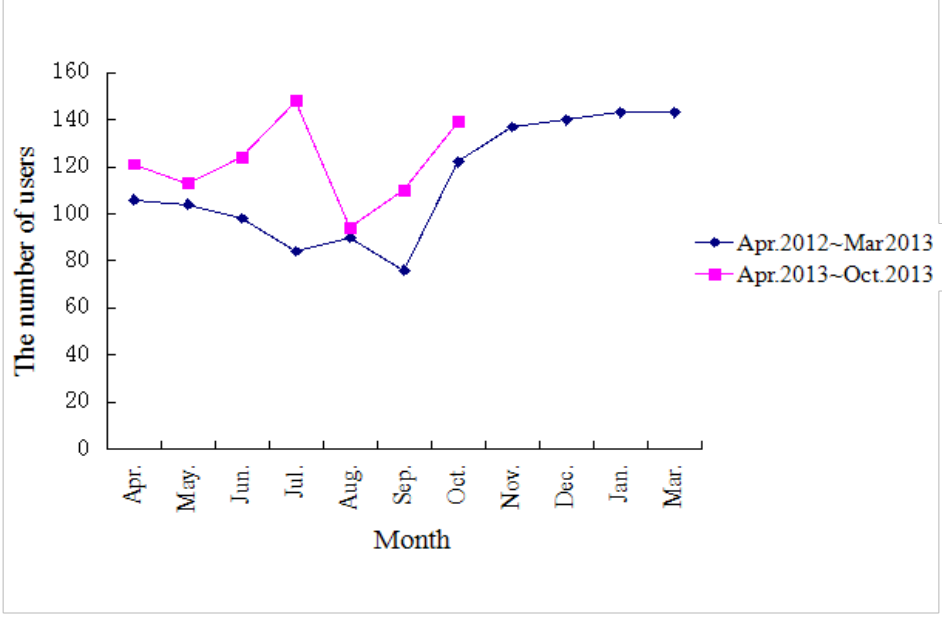

Figure 3 The number of users

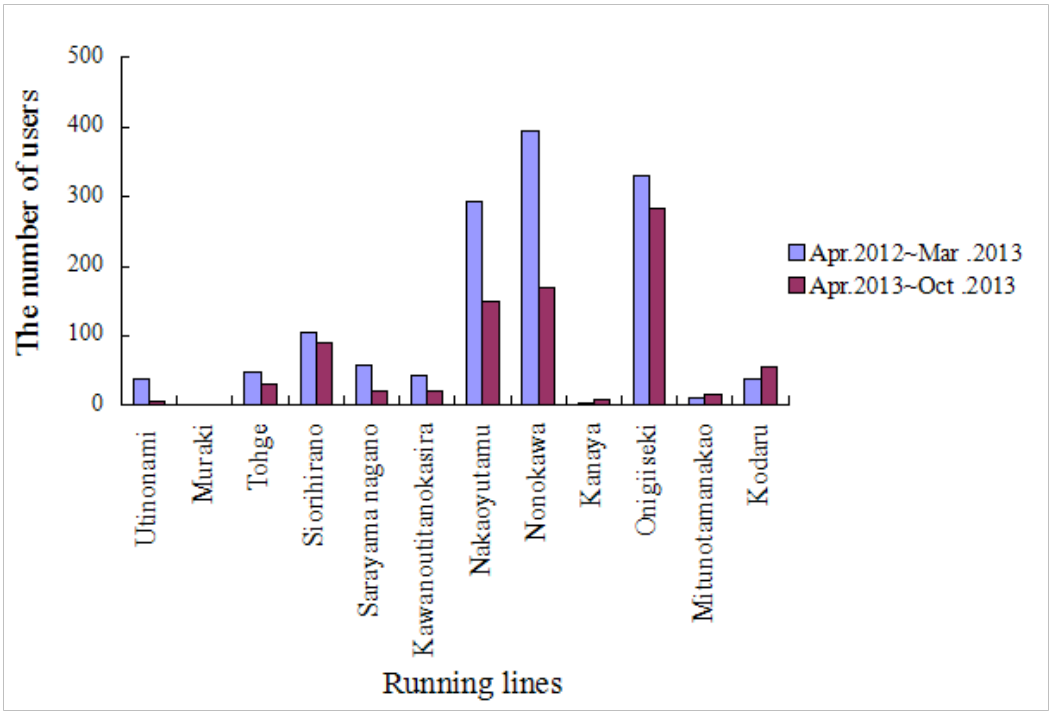

Figure 4 The number of users in each route

Table 2 The enrollment collection

Area	Family numbers	Male	Female	Total	Area	Family numbers	Male	Female	Total
Nakao-Go	158	192	211	403	Muraki-Go	285	467	482	949
Mitunotama-Go	48	66	75	141	Sarayama-Go	183	188	225	413
Nagao-Go	200	292	329	621	Hiekoge-Go	274	353	419	772
Kodara-Go	160	215	251	466	Tanokasira-Go	192	276	292	568
Nonokawa-Go	73	126	141	267	Kawauti -Go	102	162	195	357
Yumuta-Go	584	798	879	1,677	Takebeta-Go	228	327	363	690
Iseki-Go	204	314	334	648	Kougana-Go	71	101	121	222
Onigi-Go	67	113	134	247	Otunagano-Go	182	240	281	521
Kanaya-Go	166	229	280	509	Kyowa-Go	237	314	352	666
Orisikise-Go	749	1,113	1,218	2,331	Siori-Go	119	186	194	380
Syuku-Go	769	1,075	1,182	2,257	Hirano-Go	40	63	76	139

4. THE OPERATION INCOME

Table3 shows the operation income of Mayumi Taxi and Sohgo Taxi from April, 2012 to March, 2013. According to Table 3, the fare income of Mayumi Taxi was 189,700 yen from April, 2012 to March, 2013, the subsidy income was 991,398yen, and total income was 1,181,098. On the other hand, the fare income of Sohgo Taxi was 49,400 yen from April, 2012 to March, 2013, the subsidy income was 192,914 yen, and total income was 242,314 yen.

Table 3 The operation income of the Sharing Taxi (April 2012~March 2013)

Mayumi Taxi				Sohgo Taxi			
Month	Fare income （yen）	Subsidy income （yen）	Total (yen)	Month	Fare income （yen）	Subsidy income （yen）	Total (yen)
April	16,200	75,946	92,146	April	5,800	15,860	21,660
May	15,200	75,880	91,080	May	4,200	15,636	19,836
June	12,800	74,324	87,124	June	4,600	21,800	26,400
July	12,400	67,356	79,756	July	2,800	13,186	15,886
August	13,500	82,064	95,564	August	4,000	12,240	16,240
September	11,600	72,224	83,824	September	1,200	2,930	4,130
October	17,600	103,783	121,338	October	4,600	19,118	23,608
November	18,200	85,814	104,014	November	6,400	22,500	28,900
December	21,000	85,580	106,580	December	2,600	11,680	14,280
January	18,400	83,472	101,872	January	5,200	29,908	35,108
February	15,600	92,904	108,504	February	4,800	12,820	17,620
March	17,200	92,096	109,296	March	3,200	15,236	18,435
Total	189,700	991,398	1,181,098	Total	49,400	192,914	242,314

Table 4 The operation income of the Sharing Taxi (April 2013~October2013)

Mayumi Taxi				Sohgo Taxi			
Month	Fare income （yen）	Subsidy income （yen）	Total (yen)	Month	Fare income （yen）	Subsidy income （yen）	Total (yen)
April	16,800	84,776	101,576	April	4,400	21,860	26,260
May	14,800	89,184	103,984	May	4,400	17,872	22,272
June	17,400	83,322	100,722	June	3,200	19,452	22,652
July	21,000	120,112	141,112	July	4,400	15,086	19,486
August	13,000	69,800	82,800	August	3,200	14,284	17,484
September	14,200	85,640	99,840	September	3,400	14,436	17,836
October	17,700	106,368	124,068	October	4,700	24,618	29,318
Total	114,900	639,202	754,102	Total	27,700	127,608	155,308

Table4 shows the operation income of two taxi corporations from April, 2013 to October.

According to Table 4, the fare income of Mayumi Taxi was 114,900 yen from April, 2013 to October, the subsidy income was 639,202 yen, and total income was 754,102 yen. On the other hand, the fare income of Sohgo Taxi was 27,700 yen, the subsidy income was 127,608 yen, and total income was 155,308 yen. Compared the income of Mayumi Taxi with that of Sohgo Taxi, it is clear that the income of the former is approximately 5 times of the income of the latter in fare,

subsidy, and total. The subsidy income greatly exceeds the fare income in both taxi corporations, and the town office bears a considerably big financial burden.

Figure 5 shows the change of fare income from April, 2012 to October, 2013. According to this figure, it is clear that the fare income of Mayumi Taxi is bigger than that of Sohgo Taxi. Moreover, the fare income of Mayumi Taxi has been increasing. On the other hand, the fare income of Sohgo Taxi shows roughly flat.

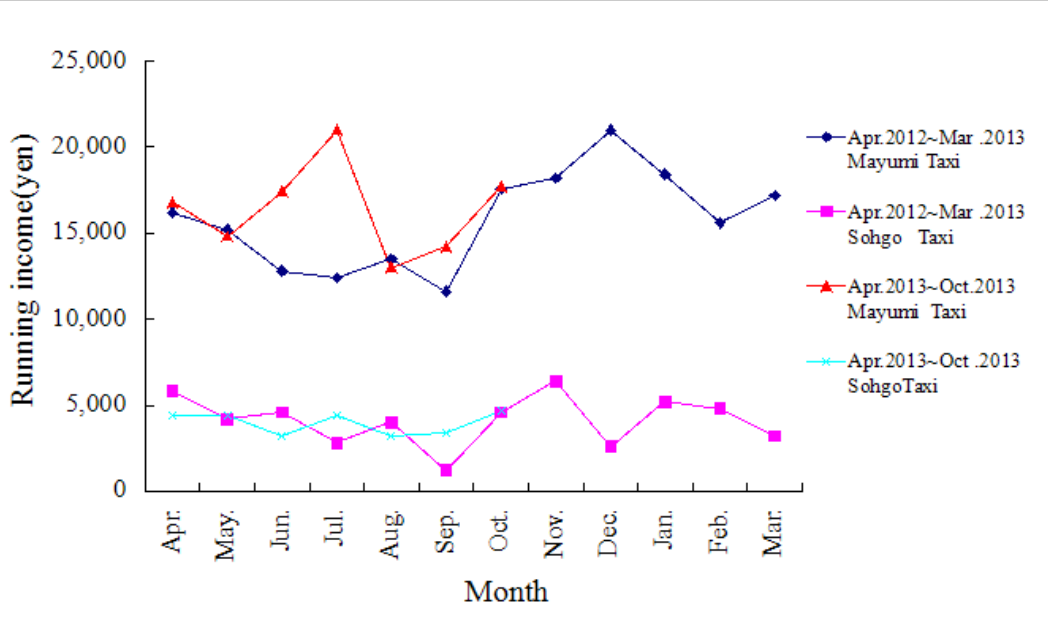

Figure 5 Fare income (April 2012~October 2013)

5. CONCLUSION

In mountainous areas of Hasami Town, there are few wide roads where a bus enters in, and a narrow road accounts for most. The present population ratio of the elderly person of this town is around 25%, and it seems to become higher in the future. In such situation, the shared taxi has been playing an important role as a means of transport for residents in surrounding area.

The Shared Taxi has a problem at the point of income and expenditure. However, it is necessary to continue operate as a sustainable public transport system. Therefore, the more examination in order to reduce the service expense is necessary.

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A Study on Effective Construction of Nationwide Orthophoto of Korea

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ABSTRACT: Since 2008, the Korean Government has provided nationwide ortho photo map service and has planned secondary correction and production project under leadership of NGII(National Geographic Information Institute). But, method of work varied depending upon types of aerial photographs to require an integrated management system and construction. This study investigated construction methods that considered camera and geographic types. The study suggested camera types that were suitable to each geographic type.

1. ITRODUCTION

In June 2010, NGII produced and supplemented ortho photo by using digital aerial photographing in South Korea. From the year of 2014, the Government prepared for civil service of aerial photographs in accordance with enforcement of the government 3.0. The aerial photograph should be effectively construction considering many factors of external effects such as photographing and weather conditions.
This study suggested construction method depending on digital aerial photographs and geographic types:

A. Investigate characteristics of digital aerial photographs.
B. Investigate construction methods according to characteristics of digital aerial photographs.
C. Investigate construction methods according to urban, farm and mountains.
D. Investigate working time by setting same working unit to keep consistency of the investigation.

2. CONSTRUCTION METHOD OF ORTHO PHOTO

In this study, photographing outcome of ADS80 of line method and UltraCAM XP outcome of frame method were used, and flow chart of photographing outcome of linear array scanner and frame camera was Figure 1.

The linear array scanner consisted of minimum 11 courses to maximum 13 courses based on 1/50,000 to be outcome of photographing of endlap 100% and sidelap 40%, and frame camera took photographing from 500 photos to 510 photos including adjacent areas. The endlap was made of 80%, and sidelap was done 60%.

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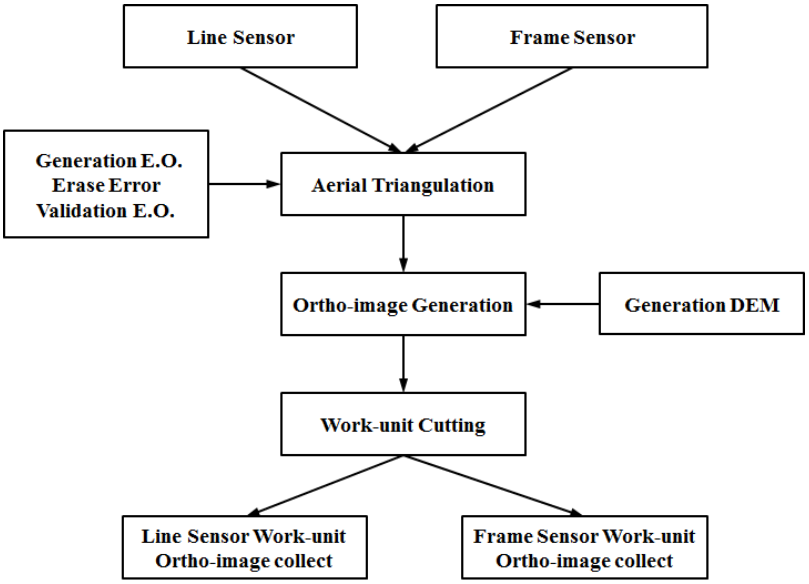

Figure 1. Flow chart

3. CHARACTERISTIC OF AERIAL PHOTO AND CONSTRUCTION MET HOD BY GEOGRAPHY TYPE

The study investigated work time depending upon geographic types of urban, flatland (including farm) and mountains.

1) Work unit of linear array scanner

The work unit of linear array scanner consisted of 3 to 4 courses based on same work unit, and d ata capacity of linear array scanner was 2 times or more larger than that of frame method was. This was because linear array scanner took photograph of images in 12-bit starting from initial photographing to store in 16-bit to prevent data from being lost. So, initial ortho photo of linear array scanner was much darker than that of frame method was.

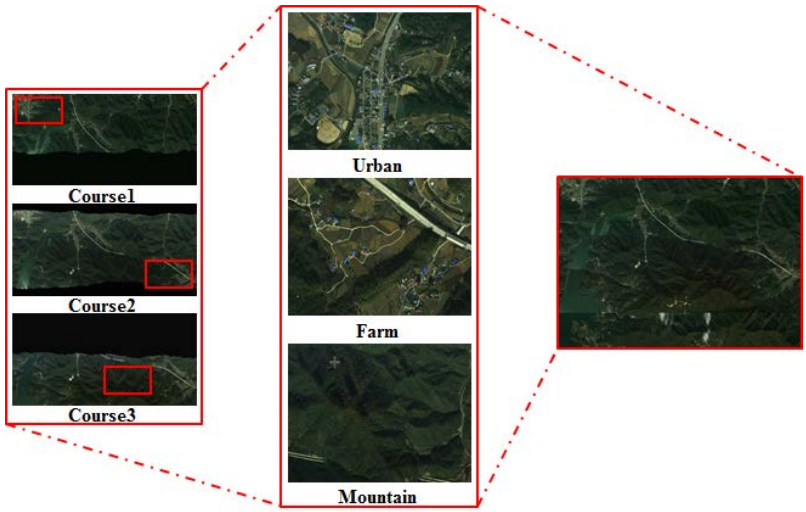

Figure 1. Work unit of linear array scanner

The linear array scanner had work unit of 3 courses or more see like Fig 2, and main processing part processed adjacent area between top line and bottom line. The linear array scanner that was made of 100% endlap had less images than frame method, and the former had very large capacity because of very much long photographing. The process from pre-processing to after-processing was made of single process to have inferior convertibility with external programs and to have very high integrity of the data.

The data type had influence upon data capacity. The data type in 12-bit image of first photographing image could not perceive by human eyes increase data capacity remarkably at converting into perceivable type. As a result, image became dark to require process solving the problem.

2) Work unit of frame camera

The frame method's work unit was not 16-bit image but 8-bit image to differ from work unit of linear array scanner and to process much easily at initial image processing and to have considerably many images of photographing at each block unit, and to increase quantity per flight course about 3 times than existing analog aerial photographing had. The work unit of frame method was used to express ortho photo in Figure 3, and footprint of the image at aerial triangulation based on 1/50,000 was described like Figure 3.

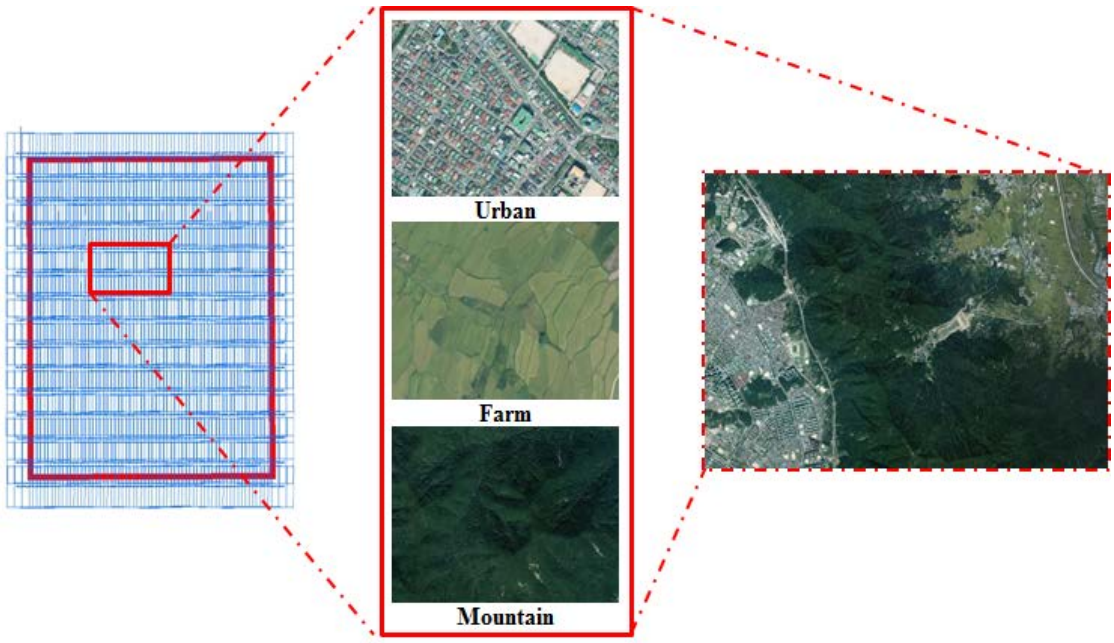

Figure 3. Work unit of frame camera

The frame method that required maximum 520 aerial photos based on 1/50,000 had photographing that was similar to that of existing analog frame. As mentioned before, the frame method had light weight of initial image capacity than linear array scanner had, and initial exterior orientation parameters data were easy to process. Processing of clearance area such as urban, flatland and mountains required many images to inspect all of surrounding images.

In this study, the line was completed in minimum 3 courses, and the frame made use of each one of ortho photo from minimum 30 aerial photos to maximum 50 aerial photos. The aerial photograph of frame method in one of work unit had configuration like Fig 4, and each one of ortho photo of frame method was left-hand figure. Each one of ortho photo was used to extract seam line to process borders of seam line naturally by addition of commercial program. In Korea, frame method that

could identify immediately despite plenty of basic data was often used than linear array scanner was done. This was because analog frame aerial photograph camera was used for a long time to have similarity of operation methods and to require less additional expenses. On the other hand, linear array scanner had applied satellite sensor for the first time from point of view of aerial photographing survey, and it was not used before to produce a lot of expenses at initial introduction, and to recover expenses of post processing process.

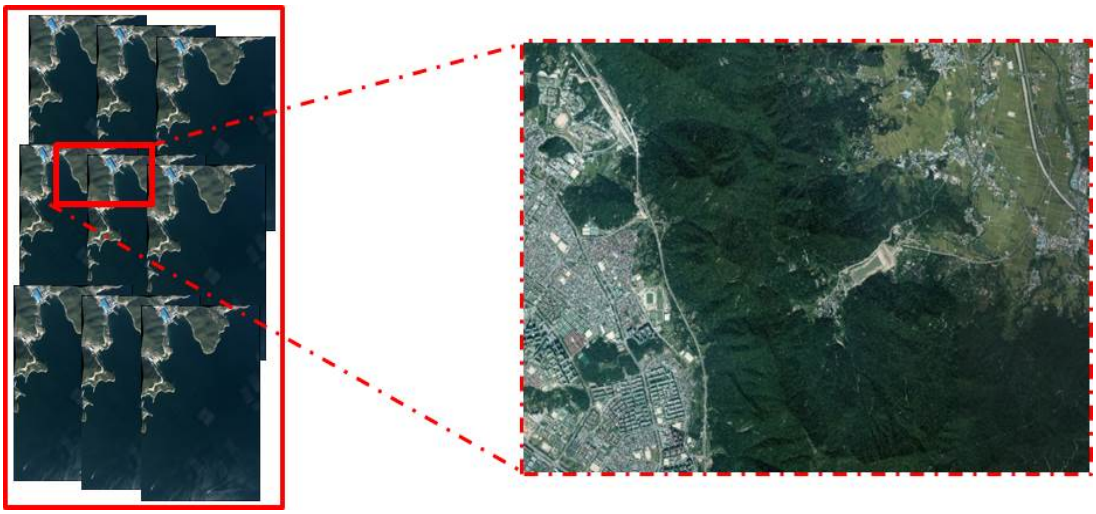

Figure 4 Work unit of frame camera2

4. RESULT ABOUT ANALYSIS

It took 1 to 1.5 day for linear array scanner to take picture, and it took 1 to 2 day for frame method to take picture. The linear array scanner took 2.5 days at urban, 1.5 day at flatland and 1 day at mountains in Table 1 and Table 2.

Table 1. Work time about type of photographing method

Camera Type	Work-Time
Line Sensor	1 ~ 1.5Days
Frame Sensor	1 ~ 2Days

Table 2. Work time about type of geography

Land Type/Camera Type	Line Sensor	Frame Sensor
Urban	2.5Days	2.5Days
Farm	1.5Days	0.5Days
Mountain	0.5Days	1.0Days

The linear array scanner was easier to work at urban than frame method was done by Table 1 and Table 2. It took similar time for both ways to work at mountains, and it took same for both ways to work at flatland.

5. CONCLUSION

This study carried out research on construction of effective ortho photo depending upon camaera types and geographic types, and obtained the following outcomes:

First, linear array scanner type of work unit could shorten work time at urban. It took similar or same time for both types to work at mountains and/or flatland.
Second, linear array scanner could produce rather favorable results from point of view of production of ortho photo at mountains areas such as Korea.

Camera types should be considered depending upon geographic types to shorten work time.

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Evaluation for Impression of Landscape and Soundscape in Incheon City of Korea

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ABSTRACT: The purpose of this study is to analyze and evaluate the relationship among objects and sounds which form landscape and sound scape in Incheon City of Korea. First, the impression of each object and sound was evaluated qualitatively by using Semantic Differential Method (SD method) in field survey. Next, each object and sound was classified into several groups using quantification theory and cluster analysis, and the points and the ranks of impression were given to each object and sound. We found that these methods were available in order to evaluate impressions of objects and sounds technically. Moreover, we made clear the relationship among these objects and sounds quantitatively.

1. INTRODUCTION

It has been recognized that we acquire various information by using five senses when we contact with the scene of a place. Hearing information seems to be the most useful one among sensory information in order to support sight information. Several studies have been made on the methods of evaluation of scenes and buildings. However, very few attempts have been made at evaluating scenes and sounds of a place by using quantitative method so far. Therefore, we think that scenes and sounds can be evaluated synthetically by applying quantitative method.

In this study, field survey was conducted in six survey points of Incheon City in Korea, and the impressions of objects and sounds which form landscape and soundscape were evaluated qualitatively by using SD method. Afterward, we applied quantification theory type 3 and cluster analysis to these data, and calculated impression scores of objects and sounds and set impression rank. The quantitative method seems to be useful in order to show the relationship of objects and sounds.

2. METHOD

Survey points of this study are shown in figure 1. Incheon is a city which is located in contact with the sea of the Midwest of Gyeonggi Province in Korea. Natural and historic objects are so rich that natural sounds can be heard in many city areas. In addition to natural objects and sounds, characteristic sounds such as sound of bell of Buddhist temple and port city can be heard. Moreover, new city areas aiming at the coexistence of skyscrapers and environment have been built, and characteristic landscape and soundscape have been formed.

In this study, six survey points which have characteristic landscape and soundscape in Incheon city were set. First, objects and sounds which formed landscape and soundscape were evaluated by using SD method. Figure 2 shows adjective pairs used in SD method. Adjective pairs such as “bad-good”, “pleasant-unpleasant”, “dark−blight”, etc. were used, and all objects and sounds were evaluated by seven degrees.

Second, quantification theory type 3 was applied to the results of the evaluations. All objects and sounds were classified into several groups by applying cluster analysis based on sample scores.

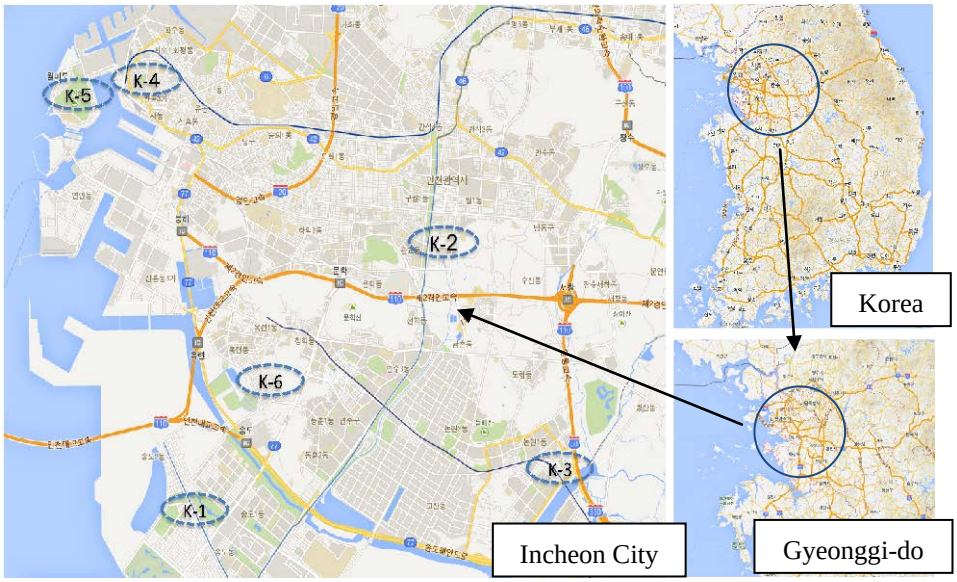
Third, categorical scores were calculated by using quantification theory, and all categories were classified into several groups. Adjective pair of “bad-good” was set as standard item, and five groups to which each category of standard item belonged were prepared. Next, multi-dimensional Euclidean distances between categories of standard item and other categories were calculated, and all categories were collected into each group to which the distance was the shortest. Afterwards the impression points were given to all categories, and the impression scores of all buildings were calculated by aggregating total points of categories. And, a histogram was drawn from impression scores, and the impression ranks were set.

Finally the results of impression ranks by categorical scores were compared with that of classification by sample scores in order to examine the adequacy of the method in this study.and points were given to individual category.

3. RESULTS

Figure 3 shows the distribution of whole samples calculated on the first axis and the second axis by quantification theory based on the results of SD method. In this figure, the numbers show the sample number and the size of triangles shows the size of sample score on third axis. Afterwards, whole samples were classified into five groups from “a” to “e” by the results of cluster analysis. It shows that there are many natural objects and sounds in group “a” and “b”. On the other hand, many artificial objects and sounds were classified into group “d” and “e”.

Figure 4 shows the result of the impression scores and rank calculated by categorical scores. In this evaluation for impression by SD method, point 1 was given to the category of “quite bad”, point 2 was given to that of “slightly bad”, point 3 was given to that of “neither”, point 4 was given to that of “slightly good”, point 5 was given to that of “quite good”, because “very bad” and “very good” were not selected. All objects and sounds are classified into five rank from “A” to “E” as shown in Figure 4. Moreover, the groups from “a” to “e” correspond with the results of classification by sample scores.



No.	Survey point	No.	Survey point
K-1	Incheon Central Park	K-4	Incheon Chinatown
K-2	Incheon terminal	K-5	Wolmido Island
K-3	Sore harbor	K-6	HeungRyun temple

Figure 1 Survey points

Figure 2 Adjective pairs used in SD method

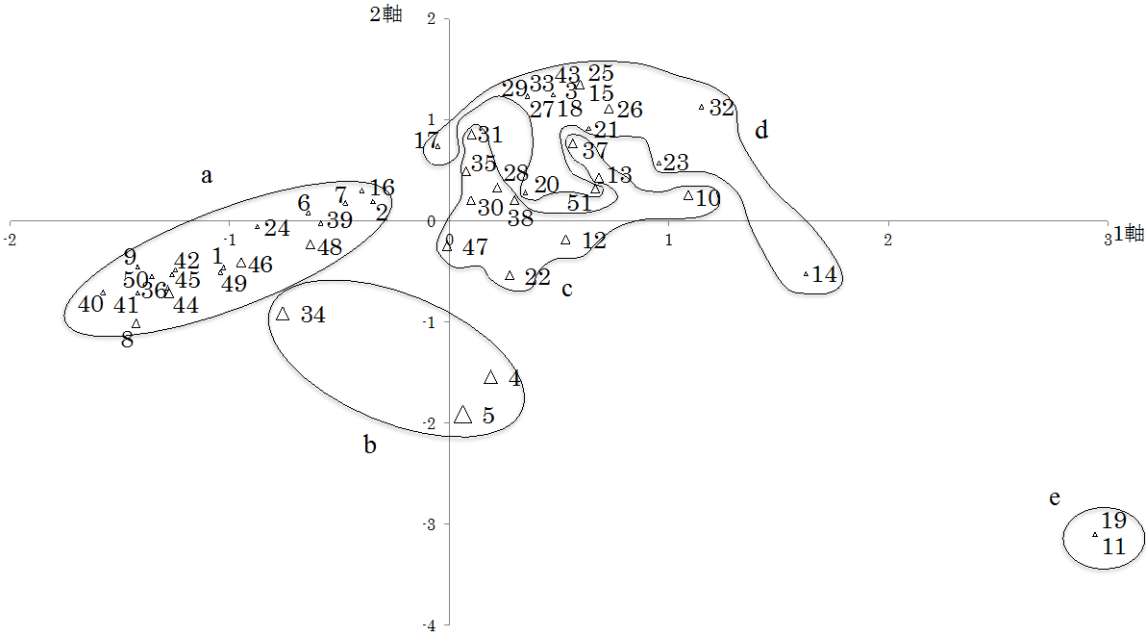


Figure 3 Distribution of whole samples

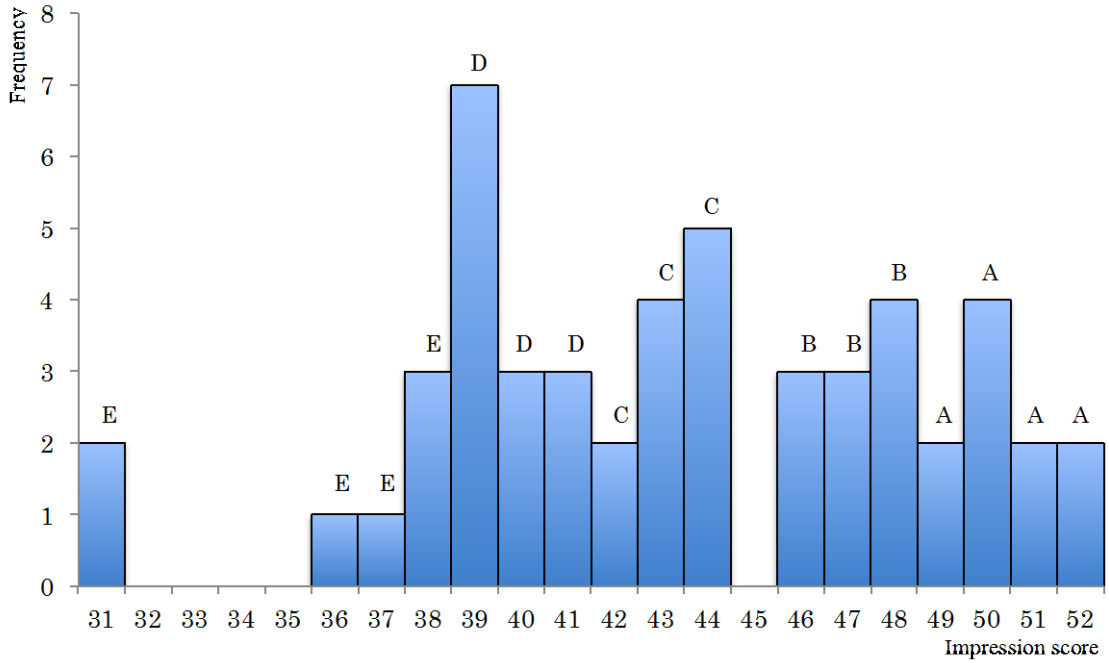


Figure 4 Histogram of impression scores

Table 1(a) Score, Rank and Group of objects and sounds

Survey Point	No	Sample	Classification	Impression Score	Impression Rank	Sample Group
K-1	8	Canal	Object	52	A	a
	9	Nearby trees	Object	52	A	a
	1	Waterwheel sound	Sound	48	B	a
	5	Buildings	Object	48	B	b
	4	Northeast Asia Trade Tower	Object	47	B	b
	6	Waterwheel	Object	47	B	a
	7	Summerhouse	Object	46	B	a
	2	Sound of insect	Sound	44	C	a
	3	Voice of people	Sound	39	D	d
K-2	16	Trees	Object	44	C	a
	13	Shopping street	Object	42	C	c
	12	Shinsegae department store	Object	41	D	c
	15	Passengers	Object	39	D	d
	10	BGM	Sound	38	E	c
	14	Cars	Object	36	E	d
	11	Sound of car engine	Sound	31	E	e
K-3	17	Voice of sales cry	Sound	43	C	d
	24	Flowerbeds	Object	49	A	a
	22	Skyscraper	Object	43	C	c
	21	Fishing boat	Object	41	D	d
	20	Stores	Object	40	D	d
	23	Sea	Object	40	D	d
	18	Voice of people	Sound	39	D	d
	25	Passengers	Object	39	D	d
	19	Sound of motorcycle engine	Sound	31	E	e

Table 1(b) Score, Rank and Group of objects and sounds

Survey Point	No	Sample	Classification	Impression Score	Impression Rank	Sample Group
K-4	30	Road	Object	44	C	c
	28	Store	Object	42	C	c
	29	Passengers	Object	40	D	d
	27	Voice of people	Sound	39	D	d
	26	Voice of sales cry	Sound	38	E	d
K-5	40	Adjacent green	Object	51	A	a
	34	Incheon Bridge	Object	50	A	b
	36	Sea	Object	48	B	a
	39	Nearby trees	Object	46	B	a
	35	Buildings	Object	44	C	c
	31	Sound of magpie	Sound	43	C	c
	38	Ships	Object	43	C	c
	37	Harbor	Object	41	D	c
	33	Voice of people	Sound	39	D	d
	32	Sound of ship engine	Sound	37	E	d
K-6	41	Sound of Temple bell	Sound	51	A	a
	42	Sound of Cascade	Sound	50	A	a
	44	The Main Buddha Hall	Object	50	A	a
	50	Pine trees	Object	50	A	a
	45	Statue of the Maitreya	Object	49	A	a
	46	Shrine of the Three Sages	Object	48	B	a
	49	Statue of the Buddha	Object	47	B	a
	48	Bell Pavilion	Object	46	B	a
	47	Avalokitesvara Hall	Object	44	C	c
	43	Voice of people	Sound	39	D	d
	51	Agora	Object	38	E	d

Impression scores and ranks of objects and sounds such as ‘Nearby trees’, ‘Sound of Cascade’ and ‘Pine trees’ were high. However, impression scores and ranks of natural objects and sounds such as ‘Sea of Sore harbor’ and ‘Sound of insect’ were low in spite of natural object and sound. On the other hand, the impression scores such as ‘Sound of Temple bell’, ‘Store of Incheon Chinatown’ and ‘Incheon Bridge’ were evaluated relatively high because these objects and sound originated in culture and tradition in spite of artificial sound. The impression points of artificial objects and sounds such as ‘BGM’, ‘Shinsegae department store’, and ‘sound of traffic’ were relatively low.

According to the results of impression scores by categorical scores and cluster analysis by sample scores, it is emerged that the impression ranks are in accordance with the result of cluster analysis by sample scores. That is to say, objects and sounds in rank “A” or “B” of which the impression scores were relatively high were classified into group “a” or “b.” On the other hand, the objects and the sounds in rank “D” or “E” of which the impression scores were relatively low were classified into group “d” or “e”.

4. CONCLUSION

In this study, the objects which formed landscape and the sounds which formed soundscape in Incheon City of Korea were evaluated by using SD method, quantification theory and cluster analysis. Consequently, we found out following points.

a) We found the relationship among objects and sounds which formed landscape and soundscape by using sample scores.
b) We evaluated all objects and sounds by calculating impression scores and setting impression rank. And, it is clear that the method in this analysis is available to the evaluation, because the result of impression rank accords with the result of sample classification.
c) Impression scores and ranks of objects and sounds which were natural or originated in culture and tradition were evaluated to be high. On the other hand, the impression scores and ranks of artificial objects and sounds were relatively low.

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An Evaluation Method for Accessibility of Complex Subway Network

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ABSTRACT: According to low carbon and green growth paradigm, the subway has been played a significant role in policy for public transportation promotion in Korea and its ratio of modal split is more than 60 % in the whole transportation mode. In new subway route planning, prediction of demand is mainly performed. Besides the existing studies are mainly analysis on urban space and demand of public transportation at subway area. Therefore, an empirical analysis on prediction model regarding change of subway accessibility and passenger behavior in accordance with construction of new subway line is much to be desired. This paper aims to suggest quantitative prediction network model regarding change of subway accessibility and passenger demand in accordance with construction of new subway line. Especially, we will discuss advanced GIS-based evaluation method in terms of passenger's mobility and network accessibility according to subway extension through before and after analysis by the space syntax model.

1. INTRODUCTION

A subway has been constructed and managed in capital region as a major public transportation infrastructure and its ratio of modal split is more than 60 % in the whole transportation mode. In addition, it has been played a significant role not only in mass transportation, relaxing traffic congestion and decreasing traffic accidents, but also in promoting change urban structure such as connectivity and mobility in accordance with integrating subway line. Space syntax model is well known as new analytical techniques for the spatial configurations of urban spaces by using a connectivity graph representation. Such a configuration of space identifies patterns can be used to study urban structures and human behaviors. Therefore, this paper aims to quantitatively suggest methodological and practical evaluations on mobility and accessibility according to change of subway line through before and after analysis by the help of space syntax model.

2. THEORY OF METHODOLOGY

Space syntax model is well known as new analytical techniques for the spatial configurations of urban by using a connectivity graph representation. It has been applied to analyzing movement in indoor spaces or in transport network It proposes a method to evaluate accessibility of network based on its topological structure. Movement can be described in an abstracted form using its topology. Topological description helps focus on the structural relationship among units. Human behavior and movement can be described using network of simple lines without considering the details such as sizes of forms, number of people and speed of movement. Hierarchical network configuration represents each

component with a node and a turn with a link connecting their respective nodes. This relationship is described as a variable called Depth. Depth is the number of lines when one passes through other lines

3. CASE STUDY

In order to make our aim come true, we constructed subway GIS network data, mainly targeting several subway lines such as Juangang where has been electrified double track subway since 2005, Gyeong Ui where has opened about 46km railway from Seoul and Munsan, and the no 9 subway line where has opened 27km from Gaehwa Station to Sinnonhyeon Station in 2009. Using developed subway network, we performed axial-map analysis and calculated spatial characteristics in order to describe topological movement interface on subway network such as dynamic control value as well as static local connectivity and global integration. That is, we analyzed rate of change of these parameters according to opening new subway line and spatial influence of directly new linked node.

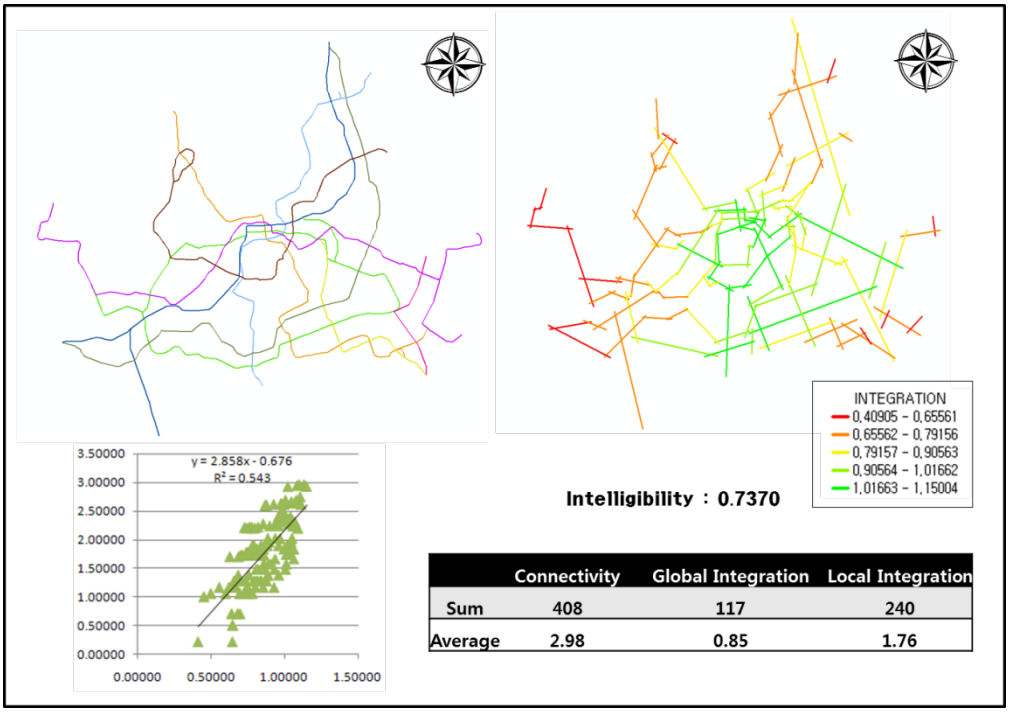

Figure 1. Evaluation Accessibility of Subway Network by Axial Analysis (Juangang)

In short, we developed quantitative prediction network approach with respect to change of complicated subway accessibility and passenger movement (behavior) according to opening new subway by supporting computational network modeling based on Space Syntax. We performed Macro and Micro analysis through Case Study. As for Macro analysis, Accessibility of the Subway in Seoul, mainly targeting the no 9 subway line through dynamic control value, static local connectivity and integration. Micro analysis on Passenger demand on Subway Line 9 and Comparative Bus Line on Major Transfer Stations with Smart Card were performed. We are able to evaluate and visualize passenger flow information based on dynamic flows of each link to analyze the time-space characteristics of network on the subway. The result of this study will be able to explain the change of accessibility in new opening subway network as well as to become efficient model for evaluating the effect of travel pattern analysis

4. CONCLUSION

As a result, we can come to the conclusion that quantitative approach with respect to change of complex network patterns according to opening new subway is capable by supporting computational modeling and analysis of al spatial network in our case studies. In addition, we are able to visualize passenger flow information based on dynamic flows of each link and to analyze the time-space characteristics of network on the subway. Last but not least, we intend to expend our method towards an integration flow data of actual public transportation passenger in order to ascertain the strong association between patterns derived from space syntax and real-time passenger flows.

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Extraction of Dangerous Roads Easily Exposed to Crime Using Korean Digital Topographic Map 2.0

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ABSTRACT: Although various information related with crime is provided, the general users are not provided with this information when they want to know dangerous roads. Narrow or curved roads are vulnerable to crime. As the crime-related information service in Korea is mostly conducted based on the information of crime occurrence condition, the information of dangerous roads are not offered. Thus, this study tried to extract dangerous roads easily exposed to crime occurrence, by using simple location information and attribute data such as road and building, using Korean Digital Topographic Map 2.0.

1. INTRODUCTION

Generally, pedestrians feel more insecurity and become short-sighted, when they use a lonesome alley or make a night walk. The isolated areas such as the blind spot due to the short-sighted or curved roads, narrow road and dead alley are exposed to crime. There is relatively more crime occurrence in these roads than the normal roads (Park, 2009).

Because our country mostly gives information on the basis of statistical information about the crime occurrence condition, pedestrians are not provided with service to grasp dangerous roads in advance when they make a night trip.

Thus, this study tries to propose a methodology of extracting dangerous roads using the attribute information of crossing angle of roads, width of road, pavement materials and surrounding buildings based on layer provided by Digital Topographic Map 2.0, not using crime-related statistical information.

2. RESEARCH AREA AND DATA OF DIGITAL TOPOGRAPHIC MAP 2.0

Research area was the surroundings of Gidong Elementary School located in Paldal-gu, Suwon-city, Gyeonggi Province, Korea, and dangerous roads were extracted using ArcObjects 10.1, softwar e development kits of ArcGIS. Figure 1 is the screen showing data of Digital Topographic Map 2.0 o f the research area.

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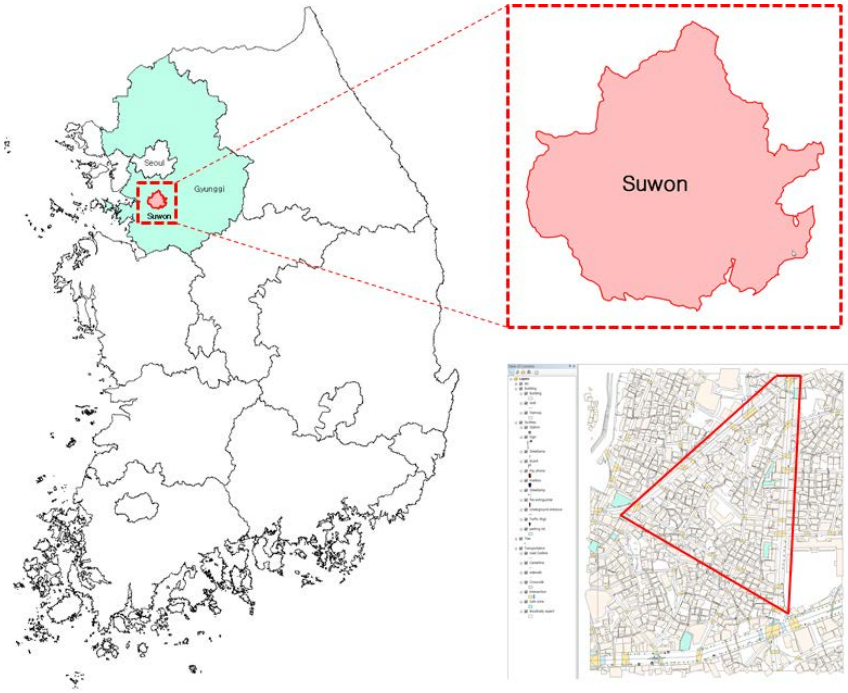

Figure 1. Digital Topographic Map 2.0

Digital Topographic Map 2.0 includes 104 layers. List items include transportation, buildings, facilities, roads, vegetation, topography, water, etc.
Table 1 shows used layers from Digital Topographic Map 2.0 for extraction of dangerous road.

Table 1. Used Layers from Digital Topographic Map 2.0

Category	Layers	Feature Types	Attributes	Contents
Transportation	Road centerline	Line	Pavement material	Asphalt, Asphalt concrete, Concrete, Block, Unpaved road, etc.
			Road width	
Building	Building	Polygon	Building type	General house, Townhouse, Apartment, building but house, non-walled building, greenhouse, building under construction, Tabernacle, unclassified.

3. METHODOLOGY OF EXTRACTION OF DANGEROUS ROAD

Figure 2 shows a methodology of extracting scores of risk rating. I extracted road intersection and

road center-line, using road crossing angle of the road center-line layer, width of road, pavement material of road and surrounding building information of building layer.
I calculated risk rating scores of attribute information of road intersection and road center-line using the calculated weightings. I expressed the calculated risk rating scores with traffic light colors that users can realize easily.

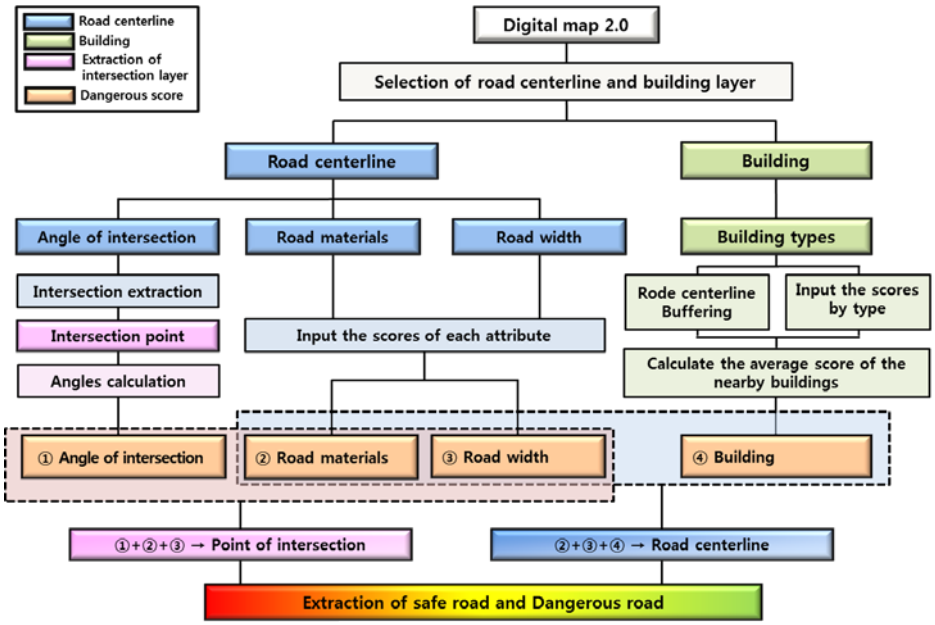

Figure 2. Methodology of extraction of dangerous road

3.1 Utilization of Road Centerline Layer

3.1.1 Crossing Angle of Road

I used an inclination angle that two roads cross for the information of indicating risk rating of road crossing angle. Figure 3 shows the process of finding the angles of road centerlines crossing each other. As the calculation of road crossing angle basically uses geometric relations of dot, line and face, I used IGeometry interface offered by ArcObjects.
After extracting the intersection in point-type through ITopologyOperator interface, I found the nearest vertex and calculated the angle.

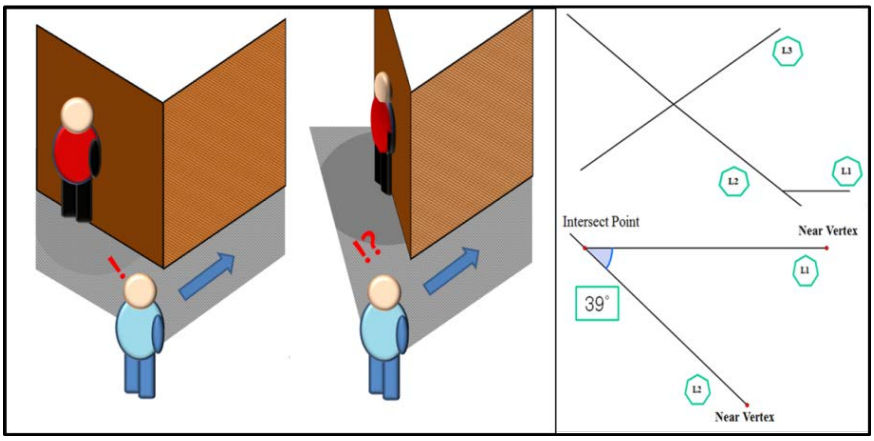

Figure 3. Structure Relation of Crossing Angle of Road

3.1.2 Pavement Material and Width of Road

The width and pavement material of road are the common attribute information of road centerline and road intersection. Low risk scores are given for the wide road, and high risk scores for the narrow road. As for the pavement material, I gave high risk scores to asphalt, block, except asphalt and concrete, which is difficult to drive, concrete and unpaved road.

3.2 Utilization of Building Layer

Figure 4 shows a buffer analysis for calculating scores by buildings, which is the results of extracting building information included in a certain distance from the road centerline. Because degrees of risk by kinds of buildings are different, I input average risk score of buildings included in buffer of road centerline.

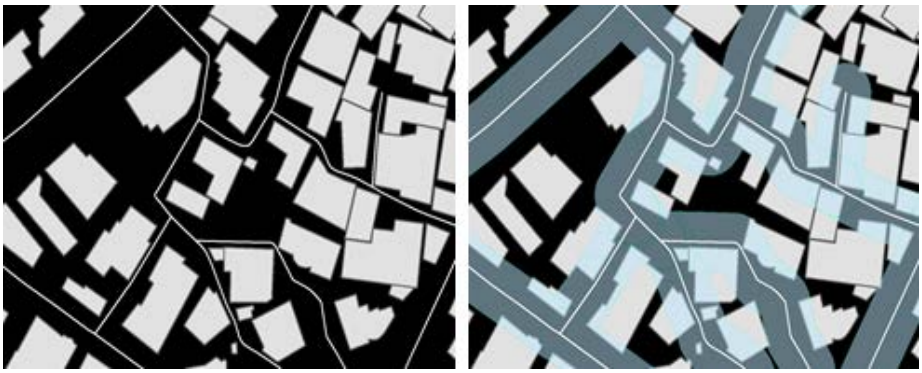

Figure 4. Buffer Analysis of Building Layer

4. EXPERIMENT

Figure 5 indicates the screen that calculated risk rating scores with research area Ji-dong, Suwon-si, using ArcObjects. Users can set up weighting as they want and draw the result value of Shapefile that the final risk rating scores are input.

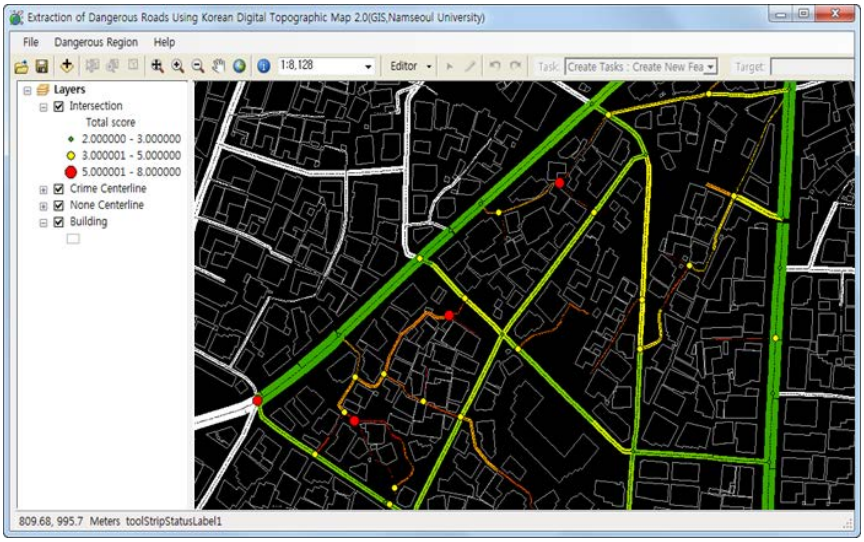

Figure 5. Implementation Results of ArcObjects

Figure 6 shows the results of calculating weightings by elements. As for the weighting of road width, I gave high risk score to the narrow road; for example, when the width of road is less than 1m. Also, I gave the highest risk score when the road was paved with concrete or unpaved. It is because the roads difficult to drive are mostly unpaved or paved with concrete(Park, 2012). When the crossing angle of road was 30°~60°(120°~150°) and when the buildings were temporary or non-walled buildings, the roads were the most vulnerable areas.

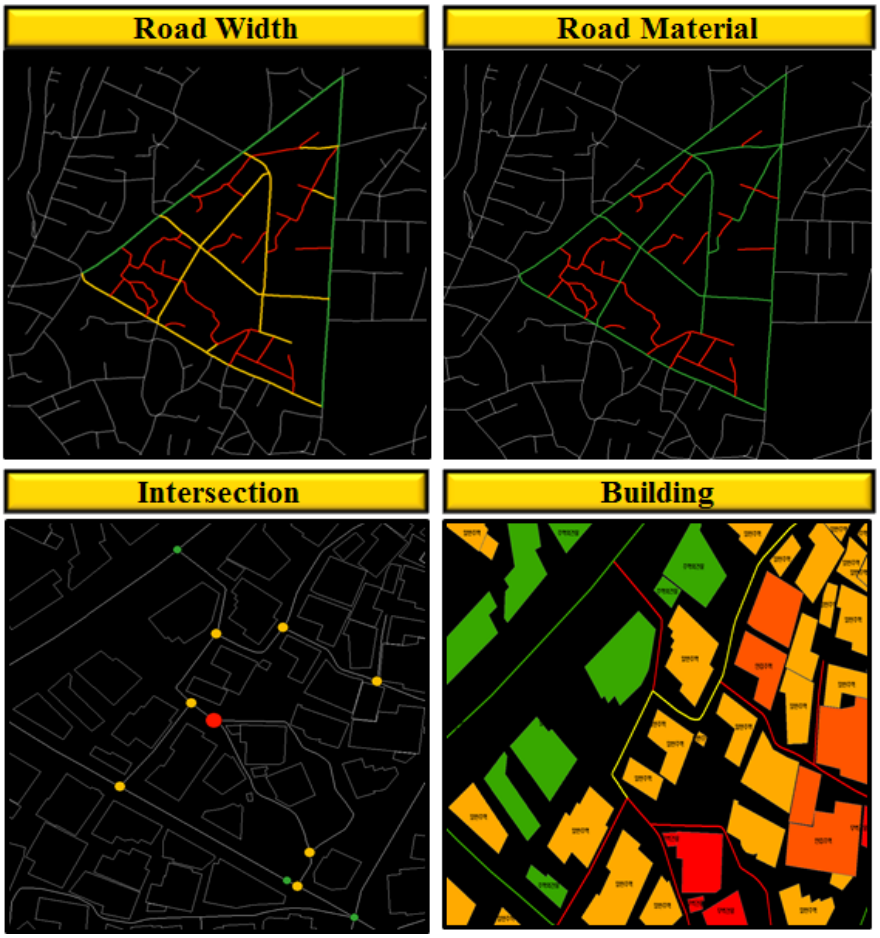

Figure 6. Implementation Results of ArcObjects

Figure 7 indicates the final results of extracting roads easily exposed to crime, which was developed in this study. As seen in the Figure 7, dangerous roads in crime occurrence were extracted from the cases that the width of road was narrow, the road was curved, and the condition of pavement was difficult to drive.

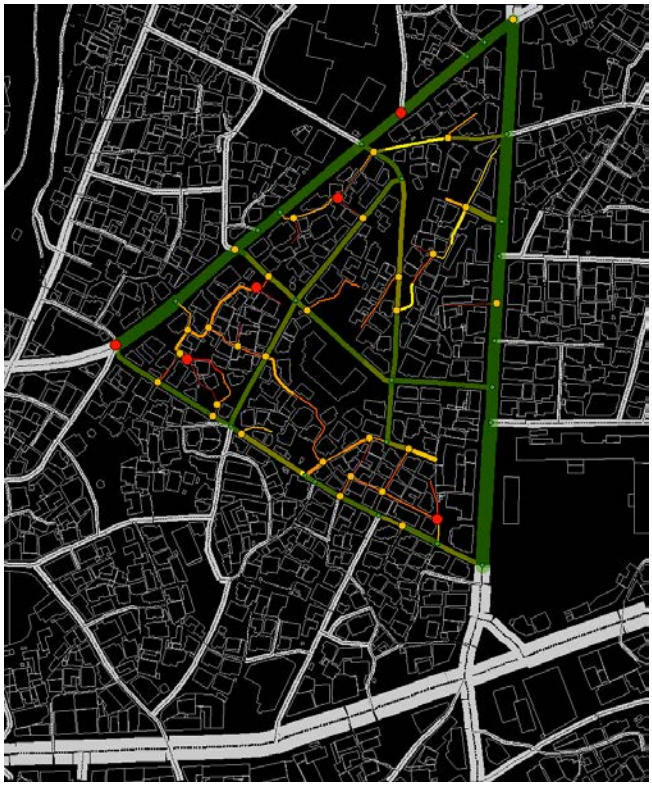

Figure 7. Final Result Map

5. CONCLUSION

This study carried out research of extracting roads easily exposed to crime through the width of road, crossing angle of road, pavement material of road, kind of building, and obtained the following outcomes:

First, I developed a technique to extract roads easily exposed to crime from the Korean Digital Topographic Map 2.0, not using crime-related statistical information.

Second, I found out through the results of extracting roads easily exposed to crime where we should establish safety facilities such as streetlight and CCTV.

It is considered that if I use various layers of Digital Topographic Map 2.0 but centerline of road and building layer used in this study and the crime-related statistical information in the future, I could extract roads vulnerable to crime occurrence more correctly.

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Inheritance Issues and Possibilities of Atomic Bomb, Nagasaki

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ABSTRACT: Nagasaki has the experience of the atomic bomb attack. The *hibakusya* longs for the abolishment of nuclear weapons with their hearts. The term "*hibakusya*"(pronounced "hee-BAH-koo-shah")is used to describe people who were survived through the atomic bombing of Nagasaki or Hiroshima on August 1945.

In this study, we would like to investigate issues and possibilities of the inheritance of the atomic bomb attack in Nagasaki by revealing and comparing efforts of people for inheritance in Nagasaki.

1. INTRODUCTION

On August 9 2013, 68years have passed since the dropping for the atomic bomb. Activities that inherit from the "August 9" are carried out efforts in many parts of Nagasaki.

Concerning about the current state of the inheritance of the Nagasaki atomic bomb, there are two problems. First one is a fading problem of the memory for the day of atomic bomb. And second one is an aging problem of *hibakusya*. The average age of *hibakusya* is more than 78 years. The number of *hibakusya* has also continued to decline to about 40,000 people. A way of inheritance for the atomic bombing of Nagasaki has been brought to public attention.

So far, there has been reported about the materials of the atomic bomb and the method of inheritance of its experience. However, there is a few study of younger generation. With regard to a generation that inherits the memory of the atomic bomb, the activities of youth is important.

This paper is intended as an investigation of revealing of issues and possibilities of inheritance for the atomic bomb attack by focusing activities of especially younger generation.

2. RESEARCH METHODS

In this paper, next four items methods are carried out.

- ✓ **Literature search**
  Materials for memory inheritance, newspaper of city hall, and Atomic Bomb Museum of Nagasaki were used.
- ✓ **Interviews**
  A staff in Atomic Bomb Museum of Nagasaki and Citizens group
- ✓ **Class observation of Nagasaki University**
  A liberal arts lecture, University-wide module courses, aiming for abolition of nuclear weapons titled "Education and the abolition of nuclear weapons" had attended.
- ✓ **Experience of peace volunteer**
  First author participated in one organization of Nagasaki city as peace volunteer from 2010 to 2014.

2.1 Results of Literature Search

According to the refference, the current situation of atomic bomb victim in Nagasaki is clear and obvious. Figure 1 is shown a change in average age and population on *hibakusya*. We realized that the decline of the number of *hibakusya* and aging of *hibakusya* are clear. On 2012, the number of *hibakusya* is 40,000 people now.

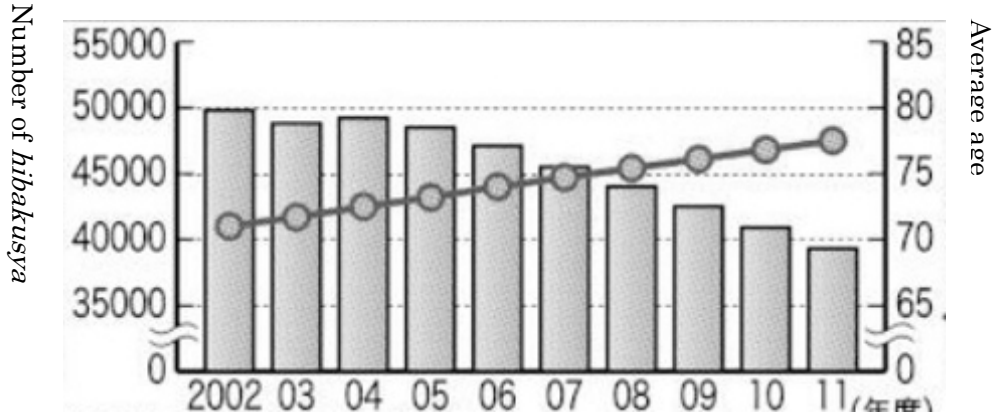

Figure1 changes in average age and population on "*hibakusya*" in Nagasaki. [1)]

And next, figure 2 shows people's response rate of the following question "when was the Nagasaki atomic-bombed?" In this figure 2, the percentage of correctly answer for the day of atomic bomb is shown.

As the correct answer, Nagasaki is 64%, Hiroshima is 53% of the mean value. All the country is 23%. The percentage of correct answer is high value with age increases. The correct answer rate of twenties and thirties generations is around 30%. However, the national wide rate in twenties to fifties is about 30%, the rate in sixties and seventies is less than 20%.

As we can see, the atomic bombing experienced cities of Hiroshima and Nagasaki has a high answer rate.

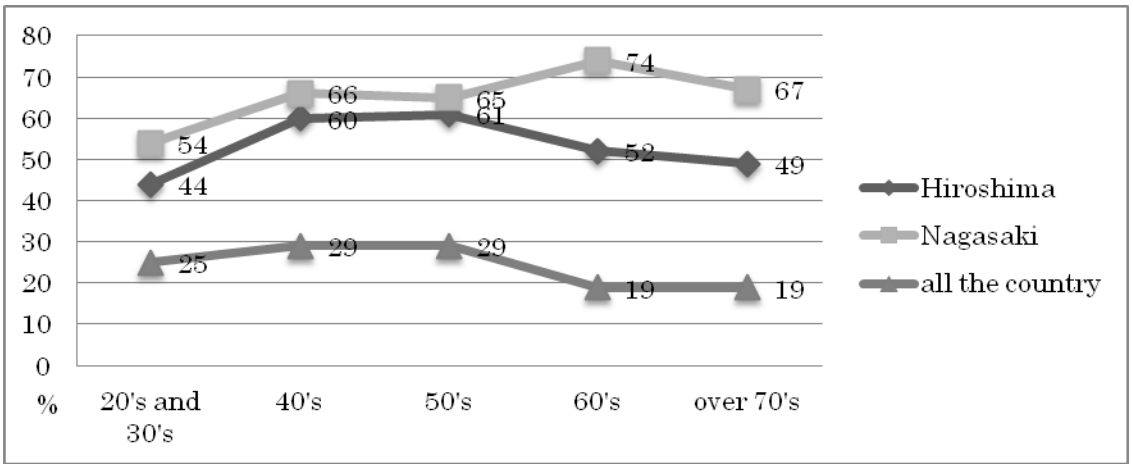

Figure2 percentage value of correct answer to "the day of the atomic bomb" [2)]

2.2 Results of interview survey

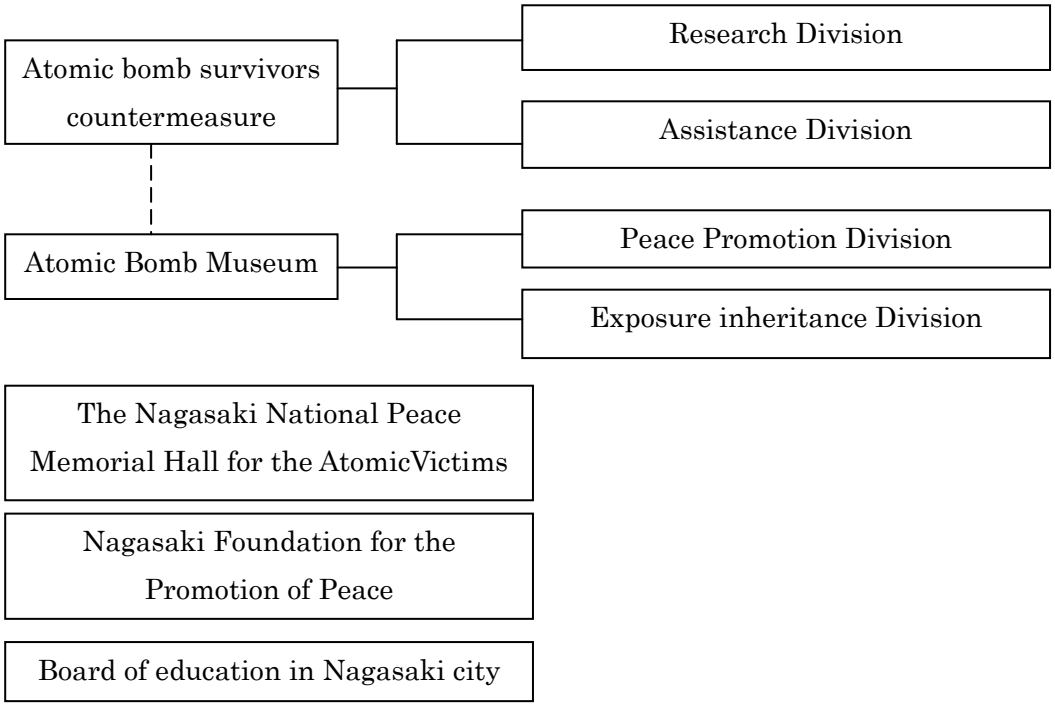

Figure3 Organization of Nagasaki city [3)]

The results of interview survey for inheritance and possibilities of atomic bomb consists of three parts as like following.

(1) Atomic bomb 1st generation

"Atomic bomb 1st generation" refers to generation that lived through World War II. They have numerous examples to show Atomic bomb as a survivors generation. They are working at Nagasaki Foundation for the Promotion of Peace. This foundation has superposed a variety of activities, and has played an important role in the bombed areas. This has four groups.

1-Atomic bomb Group, 2-Photo resource research Group
3-International Exchange Group , 4-Music Group

They has experienced war, the Atomic bomb. Based on this experience, they have been devised to inherit. The issue with atomic bomb survivor is very important points to develop the human resources, cooperation with outside prefecture, and the inheritance of bomb experience to next generation.

(2) Atomic bomb 2nd generation

"Atomic bomb 2nd generation" refers to generation that has not experience the war, between the younger generation and Atomic bomb survivors' generation. The Atomic Bomb Museum exposure inheritance Division is widely recognized as administrative this generation.

Table1 The active lists of Atomic Bomb Museum exposure inheritance Division [4)]

Project of peace studies and peace commemoration	Project of collection, preservation and utilization of atomic-bomb materials
1.Youth Peace Volunteers	1. Atomic bomb outside the prefecture Exhibition
2. Peace youth exchange program	2. Atomicn Bomb Museum Exhibition
3. Youth Peace Forum	3. Exhibitio of Nagasaki peace hill
4. Peace studies announcement	4. Exhibition of atomic bombed school building
5. Peace learning materials	5. Nagasaki ruins environment maintenance costs
6. Homepage on peace and the atomic bomb in Nagasaki	6. The atomic bombing description plate installation business
7. Appeal event of Peace (Executive Committee format), Peace Memorial event, light of peace	7. The United States National Archives Atomic Bomb research costs

《Youth Peace Volunteers》

Table2 one-year plan (2013) of youth peace volunteer [4)]

Dates	Theme	Place of activity
5/12	Orientation	Atomic Bomb Museum Peace Study Room*)
5/26	Fieldwork of Nagasaki peace hill	Atomic bomb drop centers Monument
6/16	Atomic bomb experience lecture	ibid*)
7/7,21,28	Preparation of Youth Peace Forum (The entire study meeting)	ibid*) Nagasaki Peace Hall**)
7/31	Preparation of Youth Peace Forum	ibid**)
8/4.5.6.7	(Each course-based learning, guide practice of Nagasaki peace hill, etc.)	Bombed building
8/8,9	Youth Peace Forum	ibid**) etc
8/22	Peace study meeting	ibid**)
10/27	Activities of the United Nations Disarmament Week (March of the citizen)	Peace Park Bomb dropping centers Monument***)
10/27	「Light of Peace in Autumn」	Atomic Bomb Museum, ibid***)
11/10	Discussions with foreign students	ibid*)
12/15	Bus tour	Sasebo city
1/20	Experience of Reading volunteer training course	Ibid*)
2/9	Let's organize the contents of the study meeting of the Youth Peace Volunteers	ibid*)
3/2	Summary of one year	ibid*)

(3) Atomic bomb 3rd generation

"Atomic bomb 3rd generation" refers to generation of young people have not experienced the war. In this point, we would like to talk the Youth Peace Volunteers and the lecture by Nagasaki University as an example. This group is working to develop human resources with peace-oriented younger generation.

The objective of this group is to promote the exaltation of peace consciousness and inheritance of exposure experienced by the young people. There is to learn about the war and the reality of exposure, and also to think and act about peace from various points of view. It has been implemented since 2002 .I have defined as youth under the age of 30 15 years old (junior high school graduation) or more subjects. The members are 202 people. This group listed with 117 high school students, 54 undergraduates, seven vocational school students, 24 people for the working member.

Many volunteers have little knowledge about atomic bomb except some volunteer who have enough knowledge as youth peace volunteer. However most of all volunteers need to acquire knowledge.

《the lecture by Nagasaki University》

We would like to talk about Liberal arts education lecture, aiming for abolition of nuclear weapons titled "Education and the abolition of nuclear weapons".

In this lecture, here are two kind of trial class. Those themes are Peace education and Aiming for abolition nuclear weapons. The number of student is 29 people. The whole students divided into 4 groups.

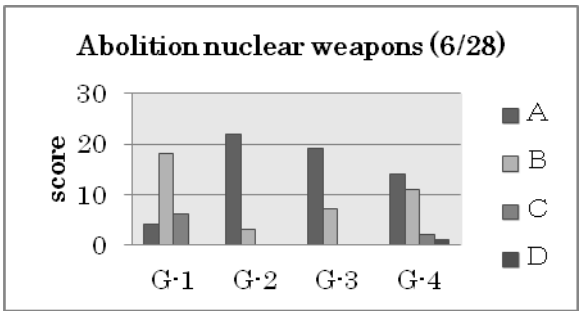

Figure4 results of obtained score

Table3 Abolition Nuclear Weapons Class

Aiming for the nuclear –free world	
group	Contents
1	The three non-nuclear principles
2	Bhutan, BB Demo
3	Nuclear and money
4	A live-action version of barefoot Gen

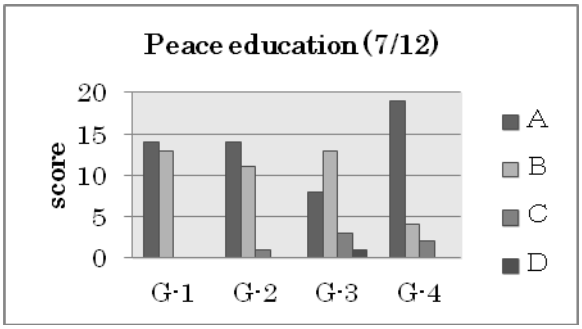

Figure5 results of obtain score

Table4 Peace education Class

Peace education	
group	Contents
1	Happiness
2	Happiness in one's life
3	Dream
4	Cambodia

The highest scored group is group2 as the abolition nuclear weapons and group4 as the peace

education. Many students are interested in BB Demo. Moreover they are interested in thing about other people than oneself. The class is to create a good environment that younger generation get active mind for peace.

3. CONCLUSION

Concerning about the current state, there are some problems of aging of *hibakusya* and a fading of the memory for day of the atomic bomb. Issues and possibilities inheritance of the atomic bomb are cleared. There are two issues and two possibilities.

Issues are like following lists

1. Collection of facts and materials in Nagasaki
2. Reconfirmation of facts and materials

Possibilities are also like following lists

1. Development of human resources to inherit the atomic bomb
2. Recording of voices of the atomic bomb survivors

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Evaluation for Impression of Buildings in Minami-yamate District of Nagasaki City

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ABSTRACT: The purpose of this study is to evaluate the degree of impression of the buildings which were designated as traditional buildings and other buildings at Minami-yamate district of Nagasaki City. At first, the impression of traditional buildings and other buildings were evaluated by using SD method in the field survey. Secondly quantification theory type 3 was applied to the results of SD method and all buildings were classified into several groups by cluster analysis based on the sample scores. Thirdly, the impression scores and ranks of all buildings were set by categorical scores and eigenvalue. Finally, these results of classification were compared in order to examine the adequacy of the method in this study. As a result, most of traditional buildings got high score, and it was revealed that most of other buildings were evaluated low.

1. INTRODUCTION

Minami-yamate district of Nagasaki City which was the subject of the study had been utilized as a foreign settlement from the late Edo era. The district has many cultural heritages such as western-style buildings, brick walls and stone pavements. The district is a characteristic area, it has become the eminent sightseeing spot, and there are many souvenir stores in the district. However, there are some buildings that give the chaotic image in these stores. In addition, there are also timeworn buildings in the district, and the historic environment of the district has been spoiled gradually. Therefore, a part of this district is designated as Important Preservation Districts for Groups of Traditional Buildings in 1992, and a government-aided project for preserving or improving the landscape has been performed.

Evaluations for scenes and buildings have been performed by using qualitative methods which were easy to be influenced by the personal subjectivity until now. However, it seems that quantitative methods are available as well as qualitative one in case of preservation of whole district.

In this study, the buildings in Minami-yamate district were evaluated by quantification theory type 3 and cluster analysis based on qualitative evaluation by using SD method. From the result, impression degree of traditional buildings and other buildings were calculated, and it shows that the method is effective in this analysis.

2. METHOD

Survey area of this study is shown in figure 1. Minami-yamate district is located in south of central area in Nagasaki city. In this study, the survey area is the north side of the whole area which is designated as the Important Preservation Districts for Groups of Traditional Buildings. The targets of this study are the buildings designated as traditional buildings and their neighboring other buildings. Table 1 shows the traditional buildings and other buildings extracted in this study.

At first all buildings were evaluated qualitatively by using SD method (semantic differential method) in survey area. Figure 2 shows the adjective pairs used in SD method. Twenty adjective pairs such as “bad-good”, “hard-soft”, etc. were selected in this study, and all buildings were evaluated with seven phases. We discussed the evaluation result and decided the final evaluation of the buildings afterwards. Results of evaluation of twelve adjective pairs which were related to the impression of “bad-good” were analyzed in this study.

Secondly quantification theory type 3 was applied to the results of SD method. All buildings were classified by using cluster analysis based on sample scores. In this study, Ward’s method was used in cluster analysis.

Thirdly categorical scores were calculated by using quantification theory type 3 and all categories were classified into several groups. In other words, adjective pair of “bad-good” was set as a standard item, and five groups to which each category of standard item belonged were prepared. Next, multi-dimensional Euclidean distances between categories of standard item and other categories were calculated, and all categories were collected into each group to which the distance was the shortest. Afterwards the impression points were given to all categories, and the impression scores of all buildings were calculated by aggregating total points of categories. And, a histogram was drawn from impression scores, and the impression ranks were set.

Finally the results of impression ranks by categorical scores were compared with that of classification by sample scores in order to examine the adequacy of the method in this study.

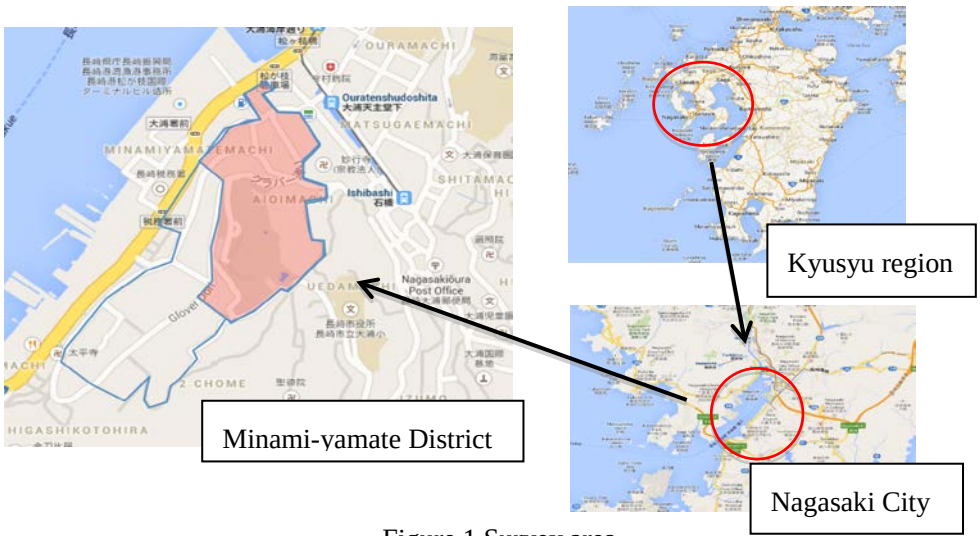

Figure 1 Survey area

Table 1 Buildings extracted in survey

Number	Name of building	Classification
1	Kogano House	Traditional
2	Kogano Building	Non-traditional
3	Villa common Minam-iyamate	Non-traditional
4	Preservation Center of Minami-yamate Districts	Traditional
5	Machida Apartment	Non-traditional
6	Machida House	Traditional
7	Orgel House (The back)	Non-traditional
8	The Art Museum of Minami-yamate (The back)	Non-traditional
9	Shimoyama Liquor Shop	Non-traditional
10	The Art Museum of Minami-yamate (The front)	Non-traditional
11	Orgel House (The front)	Non-traditional
12	Former Latin Seminary	Traditional
13	Church Priest House	Traditional
14	Oura Catholic Church	Traditional
15	Former Shimizu Residence	Traditional
16	Owaki House	Non-traditional
17	Inoue House	Non-traditional
18	Sakanabe House	Non-traditional
19	Conspicuous Green Building	Non-traditional
20	The Main building of Yuzuriha	Traditional
21	The Private house of Yuzuriha	Traditional
22	Tomita House	Non-traditional
23	Kukino House	Non-traditional
24	Nagasaki Traditional Preforming Arts Museum (The back)	Non-traditional
25	Souvenir Stores	Non-traditional
26	Ishikoro Building	Non-traditional
27	Sayayama Residence	Non-traditional
28	Minami-yamate 16th Building	Traditional
29	Minami-yamate 9th building	Traditional
30	Houseimo	Traditional
31	Foreigner Company House of Mitsubishi	Non-traditional
32	Former Hongkong and Shanghai Banking Corporation Building	Traditional
33	Fire Department	Non-traditional
34	Former Nagasaki Customs	Traditional
35	Hotel Nagasaki Gloverhill	Non-traditional
36	Former Glover House	Traditional
37	Former Jiyu Bower	Traditional
38	Former House of The President of The Nagasaki District Court	Traditional
39	Former Gatekeeper station at The Nagasaki Commercial College	Traditional
40	Former Walker House	Traditional
41	Toilet in the Glover Garden	Non-traditional
42	Dock House	Traditional
43	NO.2 Reception Gate in Glover Garden	Non-traditional
44	Former Steele Memorial Academy	Traditional
45	Former Alt House	Traditional
46	Former Ringer House	Traditional
47	Store in the Glover Garden	Non-traditional
48	Resthouse	Non-traditional
49	Nagasaki Traditional Preforming Arts Museum (The front)	Non-traditional
50	Hotel Majestic Saigon	Non-traditional
51	Glass Road	Non-traditional
52	Fairytales Museum	Non-traditional
53	Mominoki	Non-traditional
54	Souvenir Stores	Non-traditional
55	Souvenir Stores	Non-traditional

Figure 2 Adjective pairs used in SD Method

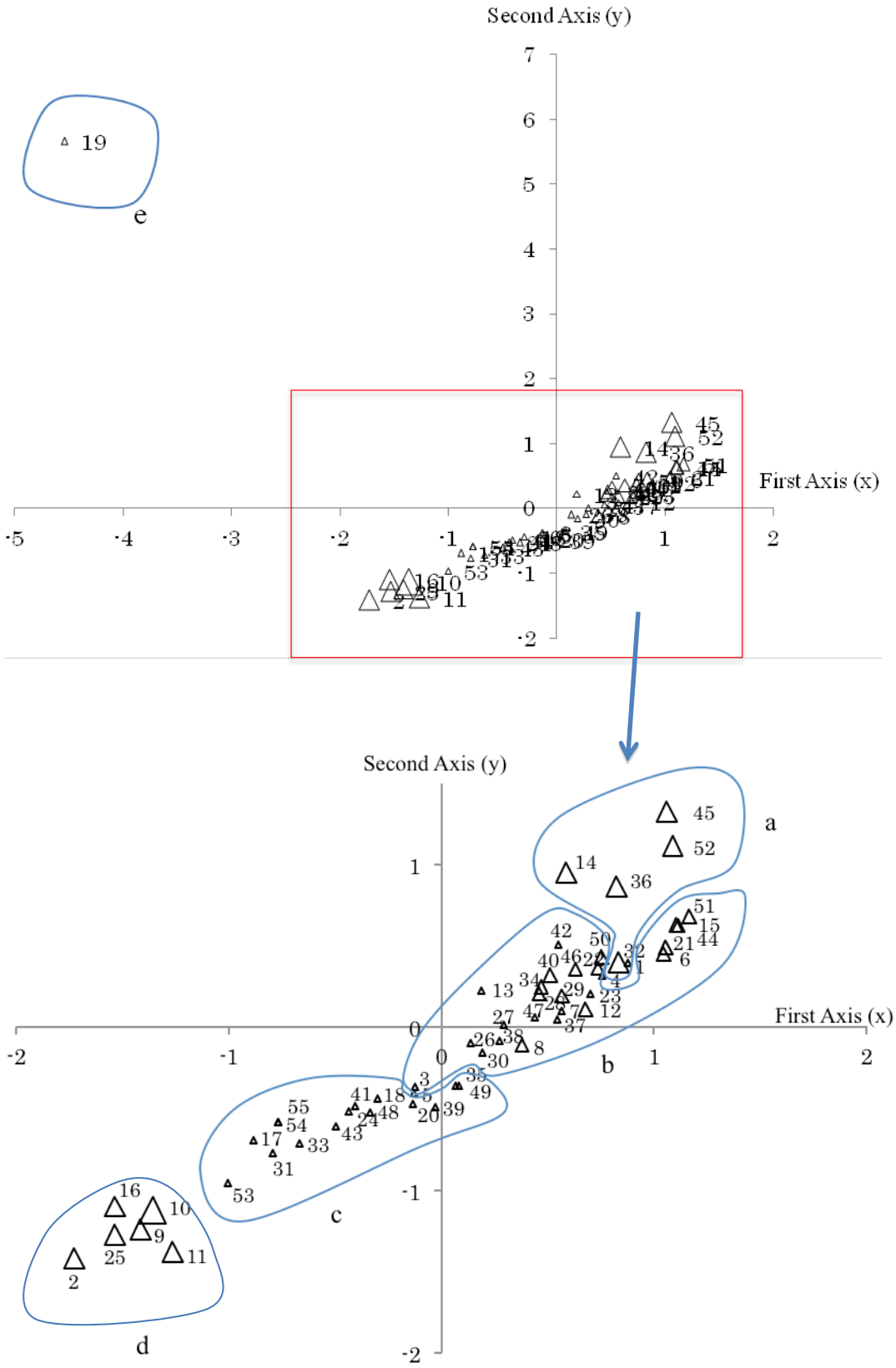

Figure 3 Distribution of whole samples

3. RESULTS

3.1 Classification of buildings by sample scores

Figure 3 shows the distribution of whole samples calculated on the first axis and the second axis by quantification theory type 3 based on the results of SD method. In this figure, the numbers show the number of building and the size of triangles shows the size of sample score on third axis. Whole samples were classified into five groups from “a” to “e” by the results of cluster analysis. It shows that many traditional buildings belong to the group “a” and “b”. On the other hand, many other buildings such as the souvenir stores were classified into the group “d” and “e”.

3.2 Calculation of impression scores and ranks by categorical scores

Table 2 shows the result of the impression scores and ranks calculated by categorical scores. In this evaluation for impression by SD method, point 1 was given to the category of “quite bad”, point 2 was given to that of “slightly bad”, point 3 was given to that of “neither”, point 4 was given to that of “ slightly good ”, point 5 was given to that of “quite good”, because "very bad" and "very good" were not selected in SD method. All buildings are classified into five ranks from “A” to “E” as shown in Figure 4. Moreover, the groups from “a” to “e” correspond with the results of classification by sample scores.

According to the results of setting impression scores by categorical scores and cluster analysis by sample scores, it is emerged that the impression ranks are in accordance with the results of cluster analysis by sample scores. That is to say, many buildings evaluated in rank “A” or “B” were classified into group “a” or “b.” On the other hand, many buildings evaluated in rank “D” or “E” were classified into
group “d”, “e”. Therefore, it is clear that both results match generally.

It is clear that the traditional buildings have high impression scores as shown in Table 2. And, Former Glover House gains 54 points (Figure 5). On the other hand, non-traditional buildings have generally low impression scores. In particular, conspicuous green building near Former Glover House has 30 points (Figure 6), and this score is the lowest one. In addition, many stores have low scores generally, and souvenir stores shown in Figure 7 have 42 points. However, Fairytales Museum has 54 points that is the highest impression scores in non-traditional buildings (Figure 8).

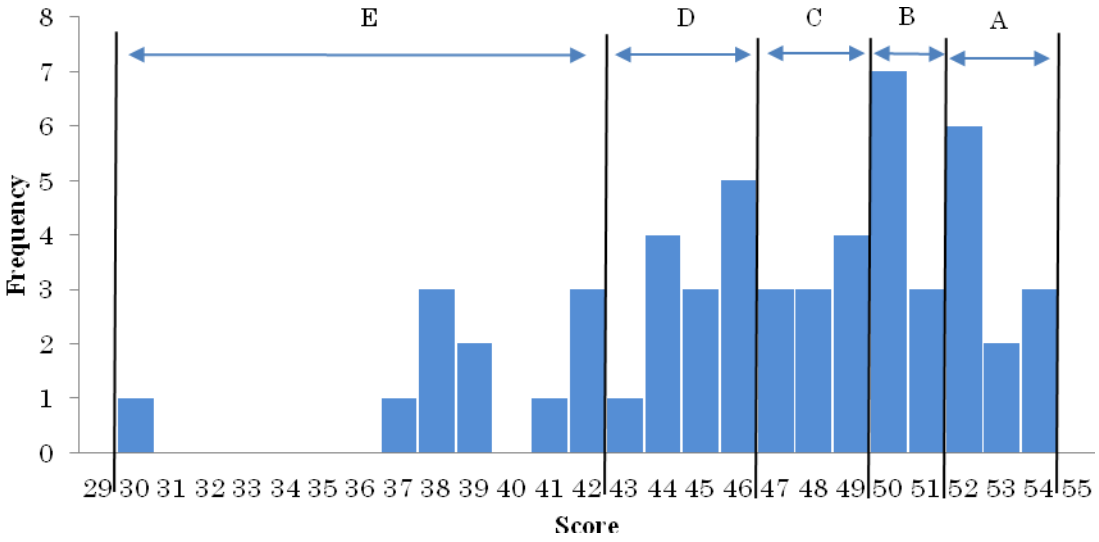

Figure 4 Histogram of impression scores

Table2 Impression scores, ranks and groups of buildings

Nnmber	Name of building	Classification	Impression		
			score	Rank	Group
36	Former Glover House	Traditional	54	A	a
45	Former Alt House	Traditional	54		a
52	Fairytales Museum	Non-traditional	54		a
32	Former Hongkong and Shanghai Banking Corporation Building	Traditional	53		a
51	Glass Road	Non-traditional	53		b
1	Kogano House	Traditional	52		b
6	Machida House	Traditional	52		b
14	Oura Catholic Church	Traditional	52		a
15	Former Shimizu Residence	Traditional	52		b
21	The private house of Yuzuriha	Traditional	52		b
44	Former Steele Memorial Academy	Traditional	52		b
4	Preservation Center of Minami-yamate Districts	Traditional	51	B	b
23	Kukino House	Non-traditional	51		b
50	Hotel Majestic Saigon	Non-traditional	51		b
12	Former Latin Seminary	Traditional	50		b
22	Tomita House	Non-traditional	50		b
29	Minami-yamate 9th building	Traditional	50		b
34	Former Nagasaki Customs	Traditional	50		b
42	Dock House	Traditional	50		b
46	Former Ringer House	Traditional	50		b
37	Former Jiyu Bower	Traditional	50		c
40	Former Walker House	Traditional	49	C	b
7	Orgel House (The back)	Non-traditional	49		b
28	Minami-yamate 16th Building	Traditional	49		b
47	Store in The Glover Garden	Non-traditional	49		b
27	Sawayama Residence	Non-traditional	48		c
8	The Art Museum of Minami-yamate (The back)	Non-traditional	48		b
38	Former House of The President of The Nagasaki District Court	Traditional	48		c
26	Ishikoro Building	Non-traditional	47		c
13	Church Priest House	Traditional	47		c
30	Houseimo	Traditional	47		c

Nnmber	Name of building	Classification	Impression		
			score	Rank	Group
35	Hotel Nagasaki Gloverhill	Non-traditional	46	D	c
39	Former Gatekeeper station at The Nagasaki Commercial College	Traditional	46		c
49	Nagasaki Traditional Preforming Arts Museum (The front)	Non-traditional	46		c
3	Villa common Minami-yamate	Non-traditional	46		c
5	Machida Apartment	Non-traditional	46		c
20	The Main building of Yuzuriha	Traditional	45		c
48	Resthouse	Non-traditional	45		c
24	Nagasaki Traditional Preforming Arts Museum (The back)	Non-traditional	45		c
33	Fire Department	Non-traditional	44		c
41	Toilet in the Glover Garden	Non-traditional	44		c
43	NO.2 Reception Gate in the Glover Garden	Non-traditional	44		c
18	Sakanabe House	Non-traditional	44		c
17	Inoue House	Non-traditional	43		c
31	Foreigner Company House of Mitsubishi	Non-traditional	42	E	c
54	Souvenir Stores	Non-traditional	42		c
55	Souvenir Stores	Non-traditional	42		c
53	Mominoki	Non-traditional	41		c
9	Shimoyama Liquor Shop	Non-traditional	39		d
10	The Art Museum of Minami-yamate (The front)	Non-traditional	39		d
11	Orgel House (The front)	Non-traditional	38		d
25	Souvenir Stores	Non-traditional	38		d
16	Owaki House	Non-traditional	38		d
2	Kogano Building	Non-traditional	37		d
19	Conspicuous Green Building	Non-traditional	30		e

Figure 5 Former Glover House

Figure 6 Conspicuous Green Building

Figure 7 Souvenir Stores

Figure 8 Fairytales Museum

4. CONCLUSIONS

In this study, buildings that formed the scenes in Minami-yamate district were evaluated by using SD method, quantification theory type 3 and cluster analysis. Consequently, we found out following points.

a) The method using SD method, quantification theory and cluster analysis to which was applied in this study was available for the evaluation of impression of buildings, because the impression ranks and scores by categorical scores were in accordance with the results of cluster analysis by sample scores.

b) It is clear that many traditional buildings have high impression rank of “A” or “B” and many non-traditional buildings such as the souvenir stores have rank of “D” or “E”. Particularly, conspicuous green building was the lowest impression score.

We describe below what we discussed about the things in order to preserve the scenes and buildings of Minami-yamate district.

a) Since traditional buildings have high impression ranks and non-traditional buildings have low impression ranks, nontraditional buildings may have influenced on the scenes of the whole district. Particularly commercial signboard and advertisement materials may give the scenes chaotic image.

b) Fairytales museum and Glassroad which had relatively high impression ranks in non-traditional buildings had harmonized with the scenes of circumference in their colors. These buildings would be helpful when other non-traditional buildings had set up.

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Comparison of Peace Education in Asia

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ABSTRACT: In this paper, comparison of peace education approaches to several countries in Asia mainly with Japan.

Nagasaki city where is first authors home town. I grew up with a feeling mind as an atom-bombed city. The peace education to most of all children of Nagasaki city has been performed up to now.
At the present day of the sixty eight years passed after the WW2, however many various agenda of this problem have arisen in peace education.

I thought that it would be a good chance to consider the meaning of peace education from the comparison research which will be realized in order to solve the problem.

1. INTRODUCTION

The word "peace education" is very many times used at the school in Japan.

But how we can understand "peace education" and in the world?

Peace is understood not only as the absence of traditional forms of direct violence, but also as a positive presence. Education for and about all aspects of peace constitutes “peace education”. It means that “peace education” brings together multiple traditions of pedagogy, theories of education, and international initiative for the advancement of human development through learning. It is fundamental dynamic, interdisciplinary, and multicultural work.

2. OUTLINE OF PEACE EDUCATION

To lay in Japan, the motion of peace is understood by peace educator in a positive way as a process of finding out the potential causes of way conflict and then the conversion of those cause into a status of righteousness, rather than to understand the notion of peace in a negative way as just the absence of war. Thus, peace can be realized through the establishment of a fundamental “culture peace” which aims to overcome the social, culture and psychological conflicts, tolerance, as non-violent conflict resolution. This “culture of peace” can be diffused to more people, and can be more continuously in a creative way through “peace education” that aims to create an atmosphere where individuals and society at large become more aware of the notion of peace and then advocate for, and create peace.

However, in South Korean, “peace education” mainly aims at issue reunification of the Korean peninsula the peace education is based on competition resolution, with the education. Of patriotism, nationalism education, individualism education, etc. It is

hoped that the peace education could make a peaceful country with the mind of "peace capability (the ability to create peace)." These concepts or outline of peace education between Japan and Korea were made to extend thinking that was not simple.

From these result, we had came to the conclusion that "peace education" was not only for war but many other issues. It means that the lecturer who teaches “peace education” have to concern not only war such as WW2 or atomic nut new issue as like regional conflict or amazing incident of class.

3. COMPARISON

At first, the comparison of peace education for Hiroshima and Nagasaki of Japan was investigated. And then, the peace education of other countries of Asia was investigated and compared with the result respectively.

3.1 About Nagasaki

- The peace education of Nagasaki city is performed based on three basic principles which Nagasaki defined in1988.
- Peace education class had about 20 hours, per year and average of 6 hours. The junior high school and the elementary school in Nagasaki had 15 hours used for peace education named “international study”.

Table1 The contents of peace education

The contents	%	Education Agency
Hibaku experience lecture	100	Education Board, Nagasaki City
Peace motto creation	86	Hibaku Nagasaki City division
Textbook	68	
Poster creation	60	
Light candle creation	55	
Kids Guernica	3	
The song of peace	99	In school
Crane Origami	85	
Investigation study	82	
Installation of books corner	78	
Panel exhibition	62	
Creation of a peace declaration	47	
Exchange with other schools	14	

- The fifth grade in elementary school has inspected the peace ruins which Nagasaki city assists and make a about atomic bomb scientific library.
- Hold the peace rally by making school day August 9, every year.
- Since there is no fixed curriculum of peace education in Nagasaki city, the educational contents and teaching method are entrusted with the teacher.
- "Peace Nagasaki" (figure-1) was created as a collection of peace study data, and it has distributed to elementary and junior high schools so that it can utilize in the case of peace education.

(a) For Nagasaki (b) For Hiroshima

Figure-1 Peace Education Materials of Nagasaki(a) and Hiroshima(b)

3.2 About Hiroshima

- Although the meeting of peace is performed every year, August 6 named atomic-bomb day is not set as a school day like Nagasaki.
- Peace education was entrusted to each teacher like Nagasaki until now.
-Teaching materials are created for teachers.
- Teaching materials of tentative plan "Hiroshima" is carried out from 1969.
-In "Hiroshima city, there are special points as like following lists peace education program of elementary school is developed and carried out from 2010.

(1) It is an epoch-making program that is dealing with a wide range contents besides an atomic bomb.
(2) Effective study which carried out focusing on several grade can be performed in this program. And it can be carried out by setting up a small unit within three or five hours in each grade.
(3) A proposal of the educational guidance proposal is included in this program, it is based on a developmental stage, and it constitutes from three steps, consisting of 3 hours to deepen
(4) The contents of this study program are participatory types.

As for old peace education, since children were defensive position in many cases. However, the new program enabled children to participate in peace study positively with interest more than one former by programming a participatory type.

3.3 Comparison with Other Country

- About other countries of Japan, comparison process was performed with books and related paper.
- The big difference in the peace education between Japan and other country is a style of peace education.

There are almost nothing as like Japan which sets up a special day for peace

education. Peace education of the almost all countries is historical lesson. It means that the style of peace education of Japan is special.

3.4 Interview Reserch

Subjectaire： 102 students of Nagasaki University (22 foreign students of these)
Question：please five words which hear and imagine word "peace education

Table-2 : Result of interview

Ranking	Japanese student	Foreign student
1	Atomic Bomb	War
2	War	Atomic Bomb
3	Hiroshima, Nagasaki	Nuclear issue
4	Lecture	Unification
5	scientific library	Society

We realized that the Japanese student is mentioned with the word "atomic bomb" firstly, but the foreign student have mentioned with the word “war” rather than atomic bomb. There are very special such as “nuclear issue” and “unification” in an image of a peace education on other countries.

Although the foreign students are almost from China and South Korea as the target, it realized that the educational theme of “peace education” has many items among each country.

From this research, we can understand it is very important to turn our eyes and consider about the other world and lifestyle of other countries for “peace education”. There are many concepts in the world about “peace education” besides about war and atomic bomb.

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A study of the community environment in a hillside area of Nagasaki, Japan —Obstacles to the livelihoods of residents —

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ABSTRACT: Through community-based observation, the present study investigated relationships between the community environment, including transportation, cultural resources and public institutions, and the livelihoods of community residents in a hillside area of Nagasaki City. Three key-informant interviews were also conducted with community leaders. Bonds among community dwellers were secure, especially in locations with historical and cultural resources and slope transportation, which facilitates communication between residents. Road conditions were deficient, but community dwellers attempted repairs on their own; however, they faced obstacles when going out to shop and/or visit hospitals, felt the need for better protection from disasters.

1. INTRODUCTION

The Japanese population has been decreasing since 2005. In particular, excluding the loss of life suffered in the Tohoku area following the Great East Japan Earthquake, the population decrease in Nagasaki far exceeds that of Japan a as whole (year-on-year rate changes per 1000 persons; Japan vs. Nagasaki, –2.0 vs. –6.6 in 2013). In the hillside areas and isolated islands of Nagasaki, population aging has advanced more than the average rate in Japan[1)]. We surmised that socioeconomic factors and/or humans' modern lifestyle were affecting the declining and aging population of this area. Few studies have examined aspects of environments like this hillside area in Japan that influence human livelihood. Thus, we conducted a detailed study of the Tenjin area, a typical hillside area in Nagasaki.

The aim of this study was to consider the relationships between the community environment and the livelihoods of those residing on the hillside.

2. METHODS

This study comprised the following three steps.

1) The first step was the field investigation. Transportation, cultural resources, and public institutions were observed.

2) The second step was to graph the annual demographic trends of Nagasaki City and Tenjin area over time.

3) The third step involved key-informant interviews with the four community leaders in Tenjin area at each local community center. Data concerning items such as the livelihoods of community dwellers and obstacles faced by the community were collected by semi-structured interviews.

This study was approved by the ethics committee of the School of Health Sciences, Faculty of Medicine, Nagasaki University.

3. RESULTS

1) Field investigation

This hillside district is located near the Nagasaki train station, but there are only two roads which could run cars of upper side or lower side. There are narrow roads (only 140 cm wide) and many steep stairs (maximum 150 steps) that residents can use to move about the community (**Figure 1**). There are two traditional shrines that residents clean regularly. This district also has three community centers that the residents use for social activities. A slope transportation system, TENJIN-KUN, was built in 2002, and has since proved helpful for all residents, particularly the elderly. In fact, TENJIN-KUN has become a place where residents from different age groups meet and communicate (**Figure 2**).

Figure 1 Steep stairs and narrow roads

Figure 2
Sloop transportation system named TENJIN-KUN

2) The changes in demographics

The changes in demographics in both Nagasaki City and the Tenjin area were compared from 2004 to 2013. Although the population of Nagasaki City has decreased, the number of households has increased. In the Tenjin area, both the population and number of households showed annual decreases **(Figure 3)**. Residents 65 years of age or older comprise 25.9% of the population in Nagasaki City, and 32.3% of the population in the Tenjin area. Notably, those 15 years of age or younger make up only 5% of the population in the Tenjin area.

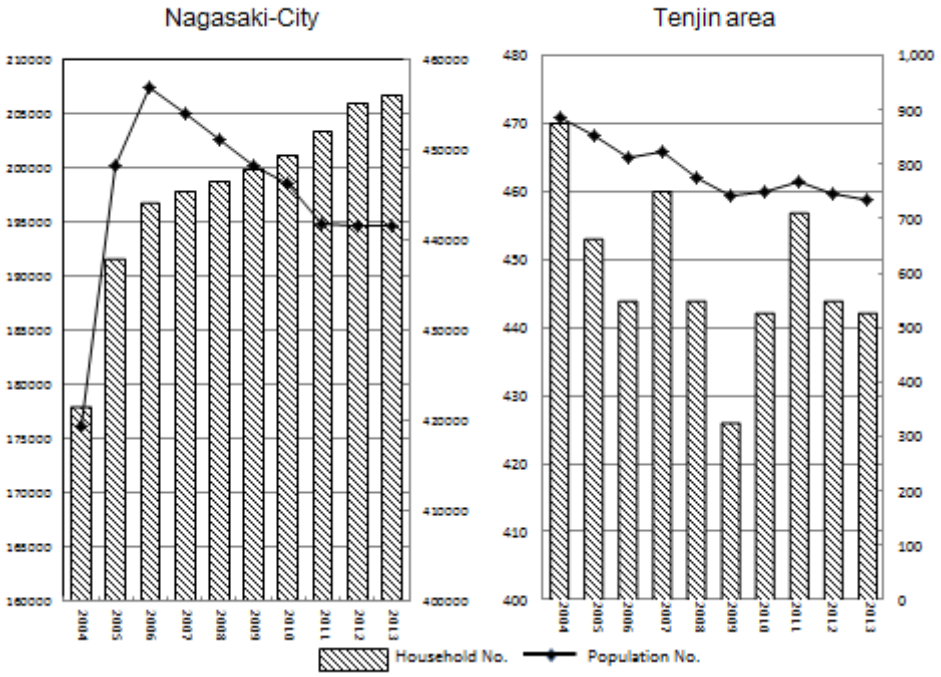

Figure 3 The change in demographics

3) Interview with community leaders

Four key informants (three community chairpersons and one community association president) were interviewed (**Table 1)**. The interviews included the following topics in relation to residents' livelihood:

(1) Obstacles to livelihood

#1: Matters related to shopping

"It's hard to go shopping. Elderly residents living on the upper side are using the shops' delivery services."

"After shopping, it is hard to go up the stairs."

#2: Matters related to hospital visits and ambulance

"We are troubled when a sudden illness or injury occurs because an ambulance cannot go that way. Additionally, it is difficult to return home from the hospital."

(2) Insecurity against disasters

#1: When there is a fire

"Fires have occurred four times over 20 years, so I am anxious about there being another fire."

"The roads are narrow, and fire engines are unable to pass."

#2: When a typhoon hits

"I'm afraid of typhoons. Twenty years ago, the roofs were blown off."

(3) Bonds among community dwellers

"We [the community association] will make a list of people who need help".

"The residents are caring for each other. For example, in the event of a typhoon, they will call elderly people who live alone."

"Community activities such as sporting events or mochi pounding are popular."

Table 1 Summary of interviewees

No.	Interviewee	Age	Sex	Occupancy (years)
1	A community chairperson	80's	male	15
2	B elderly association president	70's	male	10
3	C community chairperson	60's	male	9
4	D community chairperson	60's	female	10

4. DISCUSSION and CONCLUSION

Although the Tenjin area is located in the center of Nagasaki City and has valuable historical and cultural resources, deficient road conditions may lead to further declines in the population. The number of younger residents may increase if improvements to the roads make living in this area easier. Onomichi, a city in Hiroshima Prefecture, is a good example of how hillside areas can be revitalized, and this type of change may be effective in the Tenjin area by highlighting the night view and beautiful scenery of Nagasaki. It is important that community development involve changes that also consider the comfort of young residents.

On the other hand, obstacles to livelihood and security against disasters should be improved as soon as possible. Training of volunteer supporters and development of a disaster prevention map would be useful for elderly residents. These steps may be accomplished by capitalizing on the bond among community residents, which is a major strength of the Tenjin area.

Road maintenance to improve livelihoods, convenience, and disaster measures are all required as soon as possible for the safety and security of livelihoods in the Tenjin area. This is expected to finally lead to comfortable livelihoods for all residents of the community.

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Health Monitoring of Sewer Networks Using Video Processing Method

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ABSTRACT: The inspection CCTV systems that are examined to find any problems in the pipes relies heavily on the examiner's experience, skills, and concentration during observation. This study suggested a method to examine the sewer pipe's condition by extracting the video of the sewer's interior from a CCTV in certain frame intervals and producing a flat video applying the fisheye lens video revision technique.

1. INTRODUCTION

The most commonly used equipment to assess the condition of sewage pipes today is cabled or radio controlled self-propelled vehicles mounted with CCTVs. The CCTVs are examined to find any problems in the pipes, and the accuracy of the examination relies heavily on the examiner's experience, skills, and concentration during observation. Thus the accuracy of CCTV examination fluctuates, and is insufficient to determine subtle faults. This study will suggest a data processing method that will edit the video of the sewer pipe's interior by gridding it in certain frame intervals and combining them so even non-experts can intuitively make decisions.

2.SYSTEM and METHODS

The camera mounted on the vehicle that will film the videos is a Sony ICX 274, 1/1.18“ CCD Sensor, resolution 1600×1200, capable of filming up to 15 FPS maximum.

Figure 1 is the structure of filming the sewer with lens combinations, in this particular case of lens the video of the front and side will be filmed and an empty video will be created between them. Figure 2 is the video of the sewer using the particular lens. The obtained video using the lens of figure 1 has the identical geometric structure of a fisheye lens, and the placement of the video(figure 2) partitioned in 360 degrees in a flat 2 dimensional surface equals to figure 3.

There is direct wrapping and reverse wrapping in the wrapping method, and the direct wrapping method extracts the position of the r value and angle based on the frontal video flattened out on figure 3 during program runtime. The video processing in real time is slow since the trigonometirc functions and the value of square roots which are time consuming have to be handled, and the video may appear broken as the pixels are regarded as default values if certain pixels of the coordinates and missing, and the same pixels are references due to decimal calculation error. Thus this study used the reverse wrapping method, and the coordinates of the frontal video are calculated in advance during program binding, referencing the pixels of the coordinates acquired beforehand during runtime. The time consuming trigonometric functions and square root values are calculated in advance, allowing the video processing in real time development to be quick and accurate pixel location determination.

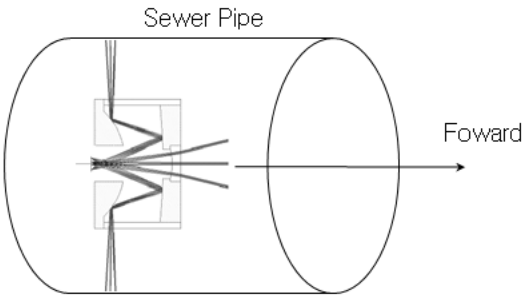

Figure 1. Video acquisition structure

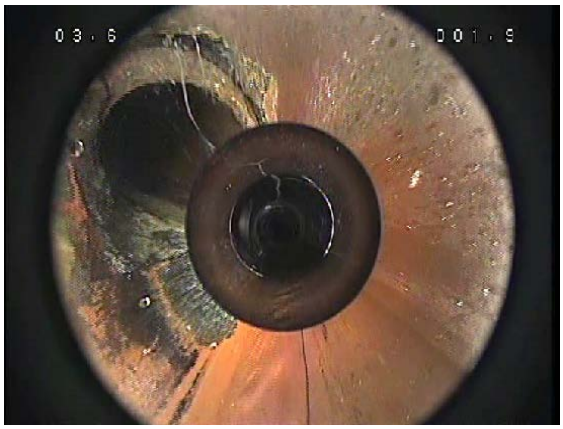

Figure 2. Obtained video

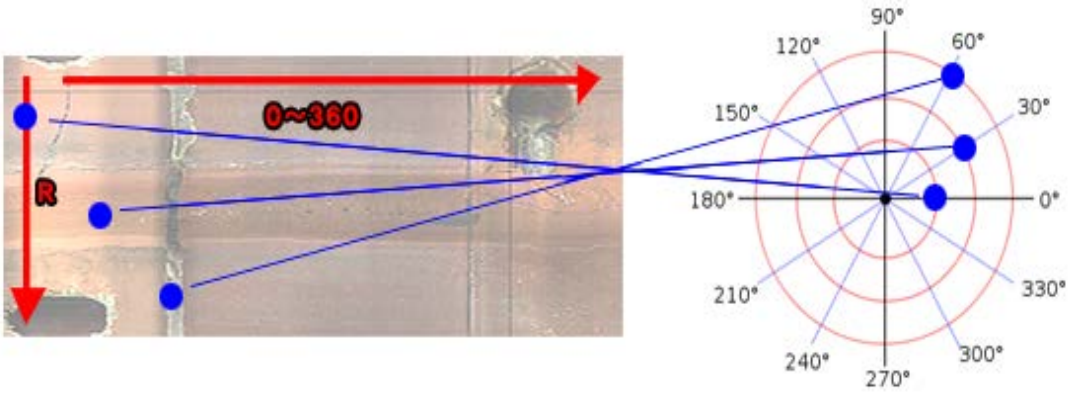

Figure 3. Revision of fisheye lens video

As the relationship between the radius and the x, y coordinates is equivalent of figure 4, the following formula stands.

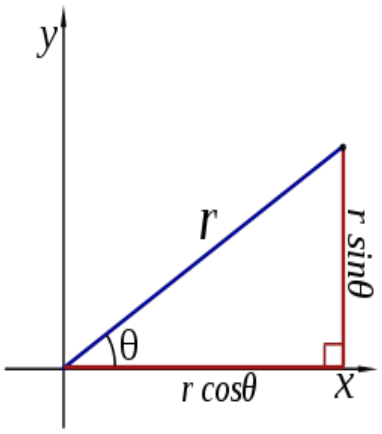

Figure 4. Coordinate system concept

$$x = r\cos\theta$$
$$y = r\sin\theta$$

$$r = \sqrt{x^2 + y^2}$$

$$\theta = \operatorname{atan2}(y, x)$$

$$\theta = \begin{cases} \arctan(\frac{y}{x}) & \text{if } x > 0 \\ \arctan(\frac{y}{x}) + \pi & \text{if } x < 0 \text{ and } y \geq 0 \\ \arctan(\frac{y}{x}) - \pi & \text{if } x < 0 \text{ and } y < 0 \\ \frac{\pi}{2} & \text{if } x = 0 \text{ and } y > 0 \\ -\frac{\pi}{2} & \text{if } x = 0 \text{ and } y < 0 \\ 0 & \text{if } x = 0 \text{ and } y = 0 \end{cases}$$

This study extracted static images in the interval of 10 frames of a 15 frame video, revised it using the geometric structure below and performed a video mosaic using the pyramid conjugation which effectively eliminates seam artifact and created a video of a single sewer pipe as of figure 6.

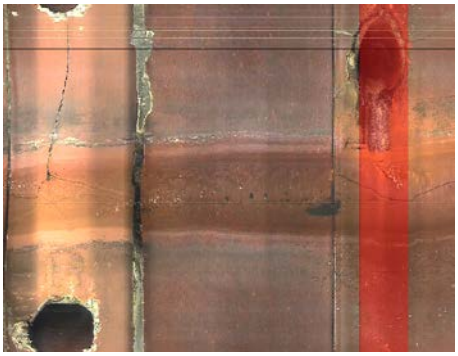

Figure 5. Video mosaic

The flattened sewer mosaic video allows easy determination of the sewer pipe's faulty joints, damage and cracks, corrosion, and joint pipe protrusion with simple analysis.

Figure 6. Sewer pipe's mosaic video

3. CONCLUSION

This study suggested a method to examine the sewer pipe's condition by extracting the video of the sewer's interior from a CCTV in certain frame intervals and producing a flat video applying the fisheye lens video revision technique. The interior video of the sewer flattened in grid forms will provide intuitive information of the sewer's interior status, and is considered to have high practical applicability in terms of maintenance and management of sewers.

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Analysis of Tools on Creating of Flash Card Materials for Reflection to Learning Contents

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ABSTRACT: Many teachers are using Flash Card Materials for learning certainty in Japan now. In this research, it was focused Flash Card Materials for reflection to learning contents at the end of class, and it was conducted a survey about creating of Flash Card Materials for reflection to learning contents against some teachers. It was revealed that many teachers thinking that Photo taken the learning contents is effective when teachers use Flash Card Material at the end of class. After all, It was conducted a comparative survey against 'PowerPoint','Scratch2.0' and 'Skitch' for revealing better tools that create Flash Card Material for reflection to learning contents. It was revealed that 'Skitch' is better tools creating of Flash Card Materials for reflection to learning contents than 'PowerPoint' and 'Scratch2.0' from viewpoint of 'Ease of creating',' speed of creating' and 'resolution of image'.

1. INTRODUCTION

There are many schools that trying to increase basic academic skills of students by introducing ICT equipment in education all over the world. Now, it is used Flash Card Materials that increase basic academic skills of students by reflection to Contents of Study again and again in a short time. There are several Use Scenes. For example, "Scene of the Start of Classes" , "Scene of the End of Classes" and "Scene of Short Home Room". There are books about using of Flash Card Materials(TAKAHASHI etc 2011). There is the Web site Teachers are using about Flash Card Materials(HORITA etc 2007). And, There are Previous studies practical about Flash Card Materials(KURIHARA 2013). From these, It revealed the point of the use and learning effect. But, they are not Contents at the End of Classes for reflection to learning contents because they are almost Contents at the start of Classes. And, It has been reported the point of the creating of Flash Card Materials, but the point of the use and better tools for creating Flash Card Materials is unknown at the end of classes. It is important to reflect on learning contents at the end of Classes. So, This Research focuses creating of Flash Card Materials for reflection to Learning contents at the end of Classes. And, The purpose of this study is to propose better tool and to create Method for creating of Flash Card Materials for reflection to Learning contents at the end of Classes.

2. STUDY METHODS

2.1 Define of Flash Card Materials

Flash Card Materials is one of Digital Materials that can present problems instantly as "Flash Card". In other words, Flash Card Materials is only to present a still image. This Materials is a simple configuration . And, This Materials is used that students get basic academic skills. This study defined that Flash Card Materials is some Digital Pictures can be switched images on PC.

2.2 Scene of creating Flash Card Materials

Not to mention, Time zone of Creating Flash Card Materials is not during Classes. But, it is preferable that teachers use contents of classes directly due to reflect learning contents. Because, seeing contents of classes again come back student's Memory directly. In that case, it is necessary to create Flash Card Materials during Classes due to reflect learning contents. But, there is little time to create during classes. Therefore, it is necessary that create time must be short time.

2.3 Proposal of Method for creating Flash Card Materials

It is general Flash Card Materials is created with keyboard input or image file input. But, their method need a lot of time. That is, it is inadequate to create during classes. Therefore, we propose to use a photo that teachers were taken Learning contents during classes as Flash Card Materials for Reflection to learning contents at the end of classes. To be more specific, Flash Card Materials is what to add Simple Annotation to picture that teachers took during classes. Simple Annotation, for example, is arrow and graphic and so on. Because, there is a possibility that students don't understand when students saw only photo.

2.4 Tools for creating Flash Card Materials

Table 1 show features of each tools. We propose some tools that can create Flash Card Materials for Reflection to learning contents at the end of classes. In general, tool for creating

Table 1. Features of tools

	input		Photo		save	
	keyboard	handwriting	directly	Add File	to web	archive
PowerPoint	○	×	×	○	×	○
Scratch2.0	○	○	○	○	○	○
Skitch	○	○	○	○	○	×

Card Materials is Presentation software such as Microsoft PowerPoint. But, Presentation software need a lot of time because of keyboard input when teachers create Flash Card Materials during classes. And, when teachers use photo, It is complicated due to insert image file taken other camera.

There is a scratch2.0 that is tools for programming on internet. This tools is software for content production by programing. It is possible that teachers can create image by simple operation because scratch2.0 have a camera function. In addition, scratch2.0 has a function that teachers can make by handwriting in image. Therefore, it is possible that teachers can create Flash Card Materials used a photo that teachers were taken learning contents during classes by No keyboard operation and No inserting image file. Flash Card Materials created by scratch2.0 are saved in an archived format on internet.

There is a Skitch that is tools for photography and photo manipulation. It is easy that teachers take photos and add annotations by Skitch. In addition, Skitch has a function that teachers can make by handwriting in image. But, Skitch has not a function that saving some photo data as one archive. It needs other slideshow function when teachers use Flash Card Materials by creating Skitch.

2.5 Experimental methods

On December 2013, questionnaire surveys were conducted for teachers of 6 after They learned creating Flash Card Materials by 'PowerPoint','Scratch2.0' and 'Skitch'. Format of the questionnaire was asked to complete a questionnaire on the following three areas on a five-point scale: Educational philosophy (5 questions), Comparison of tools (6 questions), Function of camera (6 questions).

3. RESULT AND CONSIDERATION

3.1 Educational philosophy

Table 2 show that Educational philosophy in questionnaire surveys. As a result of

Table 2. Educational philosophy

No	Question Items	Average Score	Standard Deviation
1	I think that it may not proceed as planned by the learning progress of the students in class	4.2	0.37
2	I may find such student's unique idea and a new perspective during classes.	4.3	0.47
3	I think that I would like to adopt cooperative learning of child-led actively	4.3	0.75
4	I want to use teaching materials directly contents of Blackboard	4.3	0.75
5	I want to use teaching materials directly contents of object that was found in the fieldwork during classes.	4.7	0.75

No.1-3, teachers have considered that they must do classes of child-led actively. Teachers cannot predict flow of Classes of child-led. Therefore, it is difficult that teachers had created Flash Card Materials for reflection to learning contents at the end of classes in advance. As a result of No.4-5, it revealed that teachers wanted to use Materials of learning contents.

3.2 Comparison of tools

Figure 1 show Comparison of tools about 'speed' and 'Ease' in questionnaire surveys.

A one-way analysis of variance was conducted using Points of questionnaire surveys about Ease of creating in Flash Card Materials. As a result, there was a significant differences at the 1% level($F(2,10)=19.71, P<.01$) about each tools, in addition, PowerPoint and Skitch had a higher score than Scratch2.0 at the 5% level by the multiple comparison by LSD method. Therefore, it revealed that Skitch is easier than Scratch2.0 about creating Flash Card Materials. In addition, it revealed that Skitch is easy to equivalent PowerPoint about creating Flash Card Materials despite teacher to unfamiliar.

A one-way analysis of variance was conducted using Points of questionnaire surveys about speed of creating Flash Card Materials. As a result, there was a significant differences at the 1% level($F(2,10)=9.57, P<.01$) about each tools, in addition, Skitch had a higher score than PowerPoint and Scratch2.0 at the 5% level by the multiple comparison by LSD method. Therefore, teachers feel that they can create Flash Card Materials speedy during Classes.

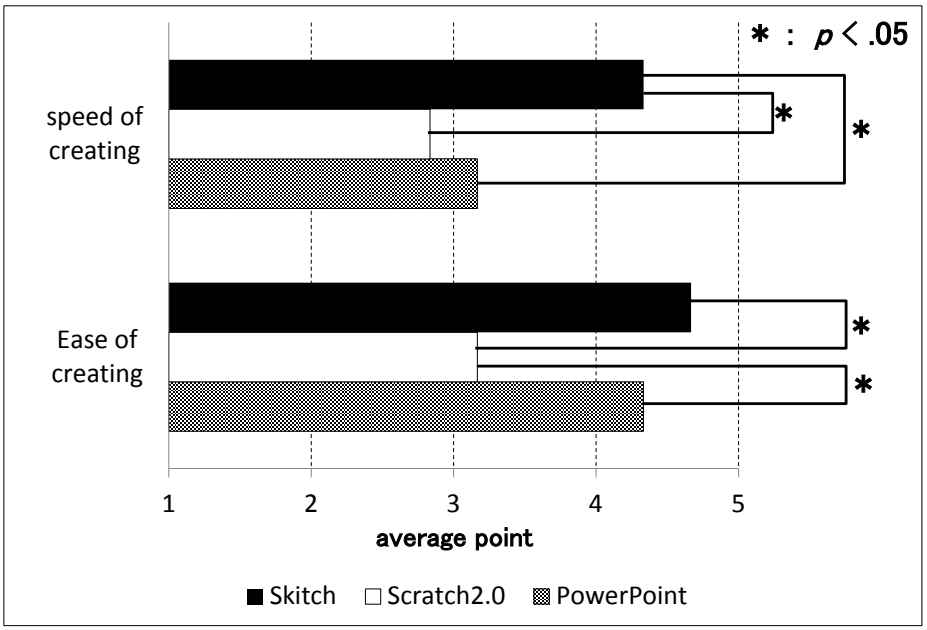

Fig. 1. Comparison of tools about 'speed' and 'Ease' in questionnaire surveys

3.3 Function of camera

Figure 2 show Comparison of tools about Function of camera in questionnaire surveys.

Function of camera in questionnaire surveys compared Scratch2.0 and Skitch because there is no camera function in PowerPoint. A one-way analysis of variance was conducted using Points of questionnaire surveys about 'resolution for taking Blackboard/Whiteboard' and 'resolution for taking objects' in Flash Card Materials. As a result, Skitch had a higher score than Scratch2.0 at the 1% level($F(1,5)=49.00, P<.01$) about 'resolution for taking Blackboard/Whiteboard' and Skitch had a higher score than Scratch2.0 at the 1% level($F(1,5)=25.00, P<.01$) about 'resolution for taking objects'. Therefore, Skitch is a tool can clearly recorded the learning contents because Skitch's function of camera is higher resolution than Scratch2.0's function of camera. Actually, resolution in Scratch2.0's function of camera is 480*360. It is expected that students can't determine contents of image taken by Scratch2.0's function of camera whether Blackboard/Whiteboard or objects. Next, a one-way analysis of variance was conducted using Points of questionnaire surveys about 'Ease of taking' in Flash Card Materials. As a result, Skitch had a higher score than Scratch2.0 at the 5% level($F(1,5)=7.35, P<.05$). Therefore, Taken by Skitch is easier than taken by Scratch2.0, and there are many teachers have considered Flash Card Materials by the photographer is easy than keyboard input.

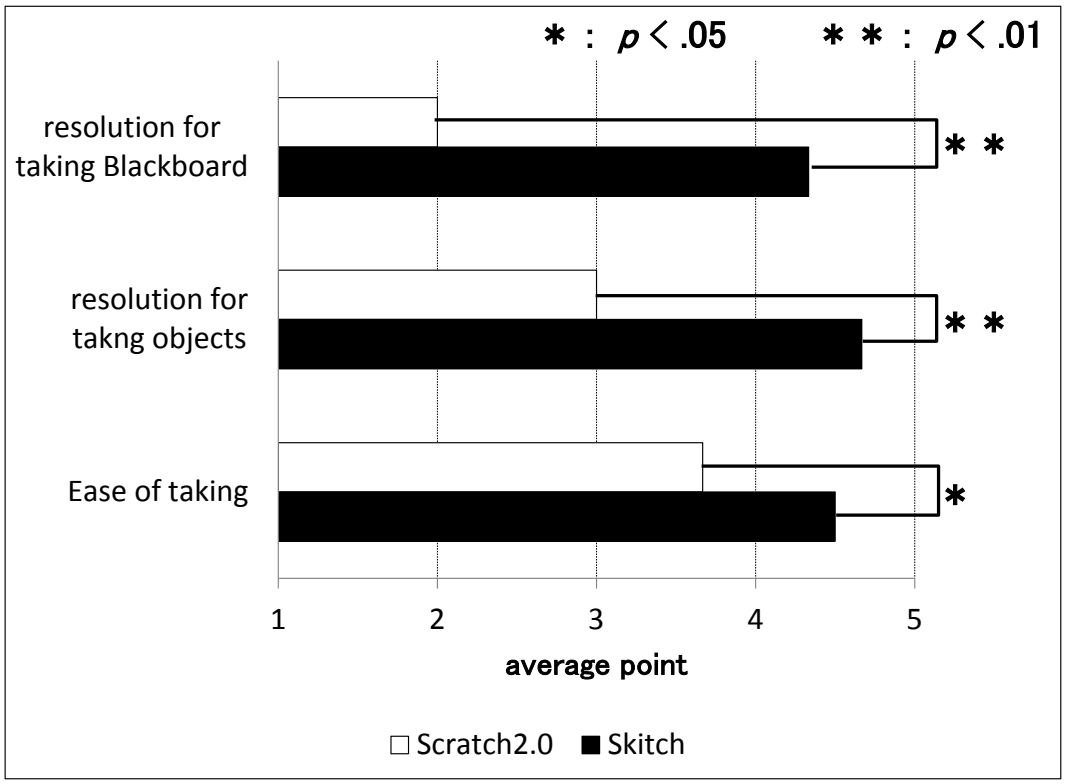

Fig. 2. Comparison of tools about Function of camera in questionnaire surveys

4. CONCLUSION

This study proposed how to create Flash Card Materials for reflection to learning contents at the end of classes, and compared each tools. The following results were obtained:

- There are many teachers have considered Flash Card Materials by the photographer is easy than keyboard input for reflection to learning contents at the end of Classes.
- Skitch is better than PowerPoint and Scratch2.0 in creating Flash Card Materials by using images teachers taken during classes from viewpoint 'Ease of creating',' speed of creating' and 'resolution of image'.

As the results, we propose to use a photo that teachers were taken Learning contents and inserted annotations by Skitch during classes as Flash Card Materials for reflection to learning contents at the end of classes.

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A study on Production of Night Road Safety Maps for Women

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ABSTRACT: Korea was investigated that the number of violent crimes of women, second-class citizens is five times higher than that of men. Night road safety measures for women is urgent in today's society that they usually come home late from schools or work places at night. Therefore, the purpose of this study is to produce night road safety maps for women by using data of various and empty spaces targeting Seoul in Korea. Night road safety maps could be producted by dividing them into 10 classes and safety night road information could be provided through the study.

1. INTRODUCTION

Recently, violent crimes targeting women and second-class citizens have continued to increase day by day and they have been badly damaged as the types got to be various. Furthermore, measures about night road of women, second-class citizens are urgent in today's society that they usually come home late from schools or work places at night.

Therefore, this study was carried out to produce maps about safe courses of night road for women targeting Seoul in Korea which shows the most violent crimes as 20% on a nation-wide scale every year.

2. ANALYSIS OF WOMEN NIGHT ROAD SAFETY MAP

2.1 Analysis Factor of Women Night Road Safety Map

Like Table 1 for producing night road safety maps for women, data about each item including safety elements, vulnerable elements, and humanistic elements were carried out. GRS80 ellipsoid-based central datum was used for spatial analysis of the collected data.

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Table 1. Analysis Factor of Women Night Road Safety Map

Factor	Division	Item	Details Factor	Analysis Factor Name	Source
Safety Factor	Safety Facilities	Night Road Safety Facilities	Light Facility Location	Streetlamp / Security Light	Ministry of Land, Infrastructure, and Transport
			Survelliance Facility Location	CCTV	Seoul City
	Safety Place	Night Road Safety Place	Public Order Place	Police / Security Center	Ministry of Security and Public Administration
			24-hour business Office	Convenience Store etc	Seoul City
Vulnerable Factor	Vulnerable Background	Crime Occurrence Place	Rape Occurrence Place	Rape Occurrence Location (Analysis of Hot-Spot)	National Police Agency
			Robber Occurrence Place	Robber Crime Occurrence Location (Analysis of Hot-Spot)	National Police Agency
	Vulnerable Place	Night Road Vulnerable Place	Crime-Ridden District	Adult Entertainment Establishment and Motel etc	Seoul City
			Woman Attack Place	Deserted House / Public Parking Lots / Public Toilet / Grocery Store Parking etc	Ministry of Security and Public Administration
Humanistic Factor	Humanistic	Night Road Safe Humanistic	Population Distribution	Total Population Survey Data	Statistics Korea
			Floating Population Distribution	Floating Population Survey Data	Seoul City

2.2 Data Process for Women Night Road Safety Map

1) Night Road Safety Facilities

Like Table 2, night road safety facilities are applicable to street lights, security lights, and crime prevention as the location data of lighting systems which light the way at night. When lighting influence is considered, the point that space is not wide. So in the study, 5m was applied to the grid size of the density analysis and 30m was done to street light space as the analytical radius. As for CCTV, the point which cannot spatially monitor wide areas was considered. So 5m was applied to the grid size of the density analysis. And the analytical radius was carried out by dividing equipment which reflects CCTV distance values into dimensions and treating the sum of the raster values which combine the analytical results into one.

Table 2. Night Road Safety Facilities Factors

Item	Details Factor	Contents	Density Analysis	Grid Size	Calculate Radius
Night road safety facilities	Location of Light Facility	Street Lamp, Security lighting	Kernel Density	5m	30m
	Location of Surveillance Facility	CCTV	Point Density	5m	CCTV Distance Value

2) Night Road Safety Place

Like Table 3, the density analysis of safe places of night road was carried out by using places for public order and security and 24-hour business offices. The spatial distance radius which has the effect on crime prevention of places for public order and security was defined as 1km and the raster grid size of 100m was used. The kernel density analysis was used in convenience stores as safety areas can be divided according to distribution characteristics because they are moved in the places with many floating populations. The grid size was set as 30m and 300m was used in the distance of analytical radius as because the spatially wide areas are less effective.

Table 3. Night Road Safety Place Factor

Item	Details Factor	Contents	Density Analysis	Grid Size	Calculate Radius
Night Road Safety Place	Public Order Place	Police / Security Center	Point Density	100m	1km Neighborhood
	24-hour business Office	Convenience Store etc	Kernel Density	30m	300m

3) Night Road Vulnerable Place

Like Table 4, crime-ridden districts and places that women can be attacked were considered in vulnerable places of night road. And the kernel density analysis was used in them.

Table 4. Night Road Vulnerable Place Factor

Item	Details Factor	Contents	Density Analysis	Grid Size	Calculate Radius
Night Road Vulnerable Place	Crime-Ridden District	Adult Entertainment Establishment and Motel etc	Kernel Density	30m	300m
	Woman Attack Place	Deserted House / Public Parking Lots / Public Toilet / Grocery Store Parking etc	Kernel Density	30m	300m

4) Crime Occurrence Place

Like Table 5, places that rape and robbery occur were considered in places that crimes occur. And the result of the density analysis from the National Police Agency was used in them.

Table 5. Crime Occurrence Place Factor

Item	Details Factor	Contents	Density Analysis	Grid Size
Crime Occurrence Place	Rape Occurrence Place	Rape Occurrence Location	Hot –Spot	30m
	Robber Occurrence Place	Robber Crime Occurrence Location	Hot - Spot	30m

5) Night Road Safety Humanities

Like Table 6, as for the night road safety humanities, the kernel density analysis was used in the density analysis of the census data and the survey material of floating populations of census output area. 100m was applied to the grid size and 1km was used in the analytical radius.

Table 6. Night Road Safety Humanities Factor

Item	Details Factor	Contents	Density Analysis	Grid Size	Calculate Radius
Night Road Safety Humanities	Population Distribution	Total Population Survey Data	Kernel Density	100m	1km
	Floating Population Distribution	Floating Population Survey Data	Kernel Density	100m	1km

2.3 Selection of Weighting

Like Table 7, data processing was carried out to select weight and manufacture night road safety maps for women by composing weight of the safety, vulnerable, and humanistic elements by item as 40%, 40%, and 20%.

Table 7. Selection of Weighting for Night Road Safety Factors

Factor	Division	Item	Details Factor	Analysis Factor Name	Rate (%)	Factor Rate	Weight (Total:1)
Safe Factor	Safety Facilities	Night Road Safety Facilities	Light Facility Location	Streetlamp / Security Light	40%	20%	0.08
			Survelliance Facility Location	CCTV		20%	0.08
	Safety Place	Night Road Safety Place	Public Order Place	Police / Security Center		30%	0.12
			24-hour business Office	Convenience Store etc		30%	0.12
Vulnerable Factor	Vulnerable Background	Crime Occurrence Place	Rape Occurrence Place	Rape Occurrence Location (Analysis of Hot-Spot)	40%	30%	0.12
			Robber Occurrence Place	Robber Crime Occurrence Location (Hot-Spot)		25%	0.1
	Vulnerable Place	Night Road Vulnerable Place	Crime-Ridden District	Adult Entertainment Establishment and Motel etc		35%	0.14
			Woman Attack Place	Deserted House / Public Parking Lots / Public Toilet / Grocery Store Parking etc		10%	0.04
Humanistic Factor	Humanistic	Night Road Safe Humanistic	Population Distribution	Total Population Survey Data	20%	70%	0.14
			Floating Population Distribution	Floating Population Survey Data		30%	0.06

3. PRODUCTION OF NIGHT ROAD SAFETY MAPS FOR WOEMEN

The layer was composed like Table 8 to produce night road safety maps for women and safety of night road was divided into 10 classes through set weight and the overlapped analysis. The safest case is applicable to class 10 like Figure 1 and high risk was indicated as class 1.

Table 8. Layers

	Safety Facilities	Safety Place	Occurrence Place	Vulnerable Place	Humanistic
Layers	Light Facility, Survelliance Facility	Public Order Place, 24-hour business Office	Rape Occurrence Place, Robber Occurrence Place	Crime-Ridden District, Woman Attack Place	Population Distribution, Floating Population Distribution

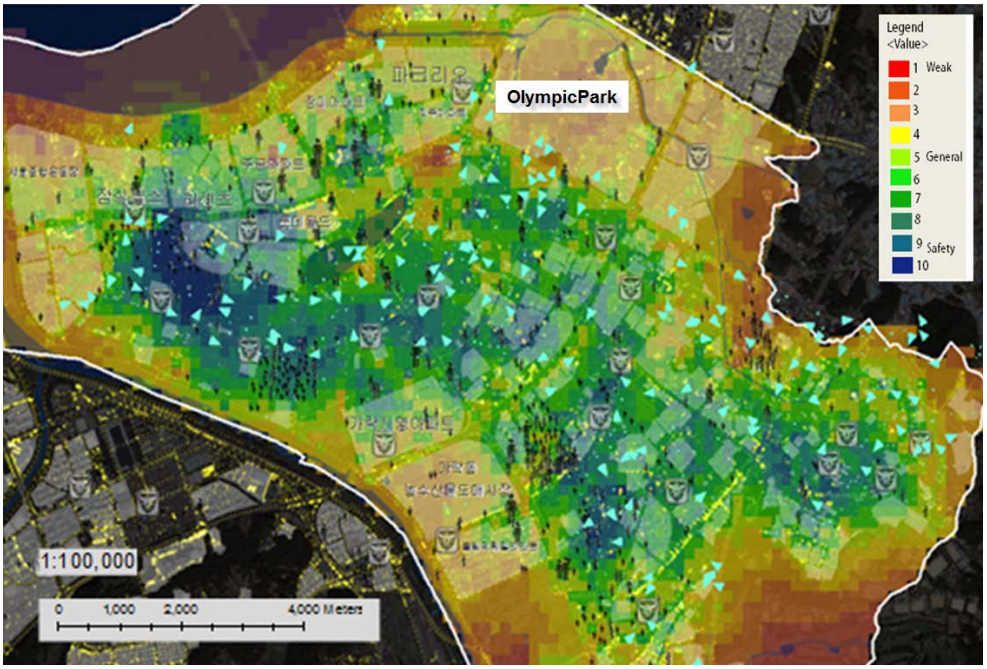

Fig 1. Night Road Safety Maps for Women

4. CONCLUSION

This study was carried out to produce night road maps for women, second-class citizens and the conclusion was drawn as follow.

First, the analytical factors to produce night road maps for women were divided into the safety, vulnerable, and humanistic elements and the data which are necessary for data process were collected. And the detailed items by element were set and the analytical methods and the grid sizes which are necessary for data processing were selected.

Second, night road safety maps were manufactured by dividing their risk into 10 classes through standard score, selection of weight, and the overlapped analysis. And women, second-class citizens could receive safe night road information through them.

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Design Scheme of Google Mash-Up Service for Safe Zone

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ABSTRACT: Various environmental indicators of safety assessment among urban design elements took a consideration for the crime prevention and design in residential safety facilities. To achieve this goal, we reviewed and organized the guidelines in domestic and international the crime prevention through environmental design. The item which is able to be qualified by GIS was derived. For setting the weight values of evaluation criteria obtained from survey, employed AHP (Analytic Hierarchy Process) to consider relative weights for the crime prevention through environmental design. The computed scores using these criteria are classified and normalized according to the levels and, finally, displayed on a Web-based GIS map.

1. INTRODUCTION

A variety of crimes frequently happened to the socially weak. National incidence of violent crime (rape, robbery, arson and murder) has sharply risen more than 16,000 in 2010.Because recent various crimes happened to the socially weak (children, woman, etc.) the social demand for a safe living environment has grown. Limitation of police-based crime prevention activities: The need of environmental design for crime prevention techniques. However, in order to cope with gradually intelligent and diversified crime, prevention activities based on only police force has limited. In particular, the aged single, multi-family housing in the high density has been occurring in a crime repeatedly. Systematic measures for this are really urgent. In addition, one of the characteristics of the violent crime is the place where the incidents tent to happen physically week and fragile environment. As the aspects of crime become much more complex and diverse not just a statistic, but scientific analysis and measures of crime are significantly required in order to understand with the spatial concept. The purpose of this study is to suggest safety map for crime prevention, which is able to analyze spatial distribution patterns for hazardous environment of crime by processing web-based content by using the mash-up service.

2. THEORY OF CPTED

The integration of between urban safety and environmental design operates on the belief that the proper design and effective use of the built environment that can lead to a reduction in the fear and incidence of crime, and an improvement of the quality of life. CPTED's goal is to prevent crime by designing a physical environment that positively influences human behavior and reduces opportunities for crime that bay be inherent in the design of structures or in the design of neighborhoods. The theory is based on five principles: Natural surveillance, Natural access control, Territorial reinforcement,

Activity support, and Maintenance. Common environmental characteristics in the area with the high-occurrence of crime are as follows.

- Aging public infrastructure: serious deterioration of housing and other infrastructure, high coverage ratio and a place without people. and complex and narrow lanes, lack of parking spaces, abandoned buildings
- Lack of space maintenance: lack of residents facilities, individual buildings with locked-in and insufficient security window , poor security measures for exposed piping
- Inappropriate location or lack of public facilities such as street lights, CCTV, emergency bell

As the effect of criminal prevention, we consider physical environmental design and voluntary citizen participation. this idea enables to give safety index score for crime prevention considering physical environmental design and planning technique through voluntary citizen participation in order to prevent crime in advance

3. CASE STUDY

We performed AHP Analysis as Estimating Method for the weights of Crime Prevention Safety Index and Calculated importance between items of Crime Prevention Safety Index. 17% people from the civic group and 33% people specializing in engineering, including 50% professors, doctors, and master's students participated in this survey. The model computes relative weight of factors through pairwise comparisons at each stage of a process (Expert Choice). To assign weights with AHP, the composite score of CPTED elements were calculated and established AHP structure by calculating weights by individual classes through questionnaire for the specialists. The result of weight are Natural surveillance (0.182), Natural access control (0.393), Territorial reinforcement (0.158), Activity support (0.121), and Maintenance (0.145). As the summation of score of weighted safety indicators for crime prevention, we produced thematic map in Seoul calculated by safety indicators for crime prevention and evaluated safety score by multiplying weight and each regional's item score. We combined the mash-up service by Google Open API with Fusion Table by using Google drive as shown in Figure 1.

Figure1. Crime Security Score based on Google Mash-Up Service

4. CONCLUSION

In this study, we developed an evaluation index to measure and quantitatively evaluate factors for Security Index in a city. In order to achieve this goal, we applied the Crime Prevention through Environmental Design (CPTED) theory. For setting the weight values of evaluation criteria obtained from survey, we employed AHP (Analytic Hierarchy Process) to consider relative weights for urban safety and environmental design. The computed scores using these criteria are classified and normalized according to the levels of pedestrian dependency and, finally, displayed on a Google map. The proposed Green Score is expected to be applicable in the visualization of the spatial distribution of dangerous area in crime and the evaluation of safety levels of crime prevention

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Regional-Oriented Curriculum For Peace Education

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ABSTRACT: after the war, peace education at schools in Nagasaki has been carried out to increase awareness of children to the preciousness of peace and inheritance of war. The only one word to describe that the war using nuclear weapons is not performed anymore. Children have their opinions freely, because they have rich child of sensitivity at all. In this research, we propose a new curriculum of peace education regionally-oriented material, in order to provide thinking time that child can extend their wide viewpoint, such as their life, family, and so on. We considered that there is significance to carry out peace education using teaching materials with regionally-oriented curriculum. We think that children would be willing to participate in the class and they could have a idea class on peace education with different perspective. We believe that it is possible to learn moral and intellectual curiosity at the same time.

1. INTRODUCTION

Now, the generation that experienced the war is aging, the people of survivors from atomic bomb are going on. Due to this change, the younger generation like elementary school, junior high, high school students, to hear the story directly from the survivors has decreased.

However, there are some peace education that has been prepared by dealing with the same subject every year. Also, photographs related on the war are presented, there are many opportunities the children would have a weak for the simulative contents.

If then, we want to provide a material that is easy to think and to imagine for them with regionally-oriented material, which is familiar for them.

2. SUGESTED MATERIALS

In November 21, 1944 during World War II, there is one regionally-oriented story [1)]. The zero fighter plane, military of Japan and B29 of the United States has become battle in the air of Isahaya, Omura City in Nagasaki. Both fighter plane has been damaged. There was a Japanese plane that performed the body attack in this battle. As a result, B-29 of the United States army, has crashed into the coast of Isahaya City. B29 which received the body attack, crashed into the sea about 500 meters of the coast Konagai unsteadily. While being not destroyed in the air, it seemed that the plane went down without even burning. B-29 exposed the vertical tail, and that had plunged into the sea at an angle. From the flight, slain bodies of eight people were pulled, naked body had been placed side by side on the ground before the warehouse near the coast.

A memorial, a monument inscribed with a poem for American soldiers is built in Konagai town. Mr.Inuo, who investigated the crash of this B-29,and built a monument and said “I want to feel how peaceful this day, compared with time that people each other. I have been hoped to mourn for them someday with the families of the crew of the B29. I fitted a metal plate in English to the monument for the day. We want to keep on thinking “The day of war”.

Figure 1 wreckage of airplane B-29 that have been moved to the Omura [2)]

Figure 2 Crew of B-29

Figure 3 Memorial stone that being carved crew list of B-29

Figure 2 monument inscribed with a poem

3. CURRICULUM FOR EDUCATION

How can use this suggested curriculum for peace education.

First, we want to think what children learn by educational material for peace education. Considering this plan, we assumed that children could remind it dropped the bomb on Nagasaki. It might have been damaging to Konagai people who built the monument lived. In the worst case, the American machine may have been take away the life of someone in Konagai town. In that situation, even if they were enemy each other, people in Konagai town, thought that them, built a monument for the 11 crew in a place that seems to warm they can see the Ariake Sea.

The goal of this curriculum is that we want go to expand educational concept with a specified attitude could stand to think about each other by thinking peace. Teaching side must consider that children can think in the various perspective through the effects of mutual understanding, the international sense. Educational materials about American soldiers of Konagai town in Isahaya are not only for peace education, but making show a variety of class.

Today, Suicide and bullying are frequently in Japanese school, we have to take care of themselves and their mind. The most important thing in class understands other person, knowing themselves. In other words, it is a mutual understanding. We would like to propose the lesson plans that children can learn about it.

4. QUSETIONAIRE SURVEY

We conducted a questionnaire survey to 20 students from the university. The following are

question and result.

(Q-1) Do you think that there is significance to practice peace education using theme of regionally-oriented material?
(Answer → Yes:18 No:2)
(Q-2) Do you think that this material could have an impact to today's peace education?
(Answer → Yes:14 No:6)
(Q-3) Do you think that children could think about war as their own thing?
(Answer → Yes:15 No:5)
(Q-4) What you think and feel about the peace education.
What you think regionally-oriented material.

- I hope that there is peace education which can spread the concept of peace.
- World War II with atomic bomb is very intense feeling. But it is important for us to connect with story of war and international conflict.
- In each of those position as a student or teacher , they have to make.
  They should make an opportunity to think about what is peace education and what is atomic bomb and so on.

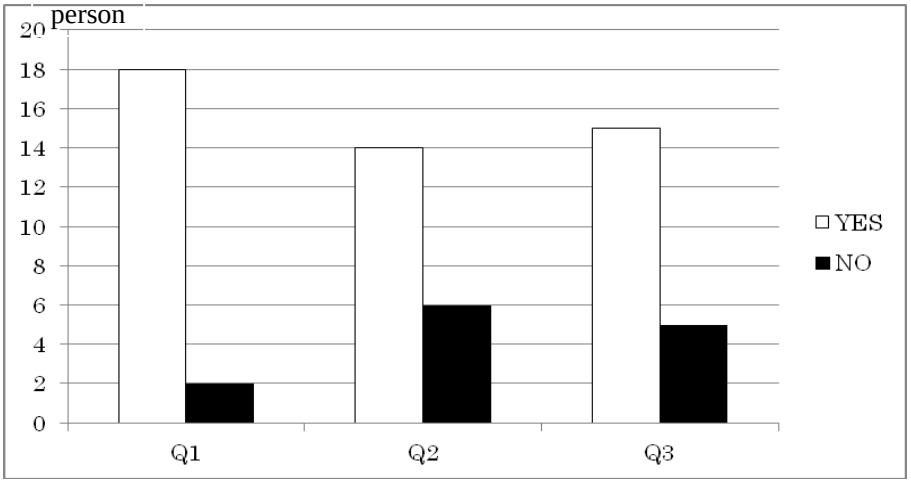

Figure 5 Results of the questionnaire survey (within 20 person)

5. RESULTS

From the result of questionnaire survey, how to tell children the atomic bomb experience of war to children is very important. How make use of that they think and feel is also very important. So, even if the content is difficult for children, we should devise it to feel close, make it easy to imagine. Peace education needs to make a sense that children consider it as their own thing.

Consequently, to think of idea and make resources, children participate in the class voluntarily with different perspective. They are able to learn Intellectual curiosity and moral too. Finally, I conclude that peace education using regionally-oriented material is worth to perform.

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Margaret Atwood's Speculative Novel *Oryx and Crake* Problems of Bio-engineering in a Future Society

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ABSTRACTS: Margaret Atwood's *Oryx and Crake* [1] (2003) is the first novel in her *MaddAddam* science fiction trilogy. It is set in 2027, when society uses advanced transgenesis in many ways. Eventually, bioterrorism perpetrated by a mad scientist named Crake puts an end to most humans, and only Crakers, new humanoids he creates through gene modification, survive.

Through her fiction, Atwood warns that scientific developments especially in the area of bioengineering might ultimately result in such a dark future. In order to prevent a disaster, we need to consider her warnings. This presentation will survey the uses of bioengineering and people's reactions to them in the futuristic world of Atwood's novel. In addition, it will introduce the viewpoints of political scientist Francis Fukuyama, biologist Edward Wilson and nuclear chemist Jinzaburo Takagi to expand the discussion.

1. INTRODUCTION

Oryx and Crake is the first work in Atwood's "MaddAddam Trilogy" followed by *The Year of the Flood* [2] (2009) and *MaddAddam* [3] (2013). She considers her these futuristic novels "speculative" rather than ordinary, popular science fictions. In them, she is most concerned with what kind of future awaits us if society continues developing as it is now. She describes the future world and its problems vividly and inventively, making us, as readers, feel as if we actually live in this imaginary world that will follow our present age.

In 2027, the year in which Atwood's story begins, biotechnology has become highly advanced in many ways that benefit humans: new hybrid animals created through genetic manipulation can be used for organ transplantation,-; genetically modified plants and animals have been produced to increase food resources,-; and new medicines have been developed to conquer powerfully tolerant new viruses. Eventually, however, humans become almost extinct because of the bioterrorism caused by a scientific genius Crake, and after that, new humanoids he creates, called Crakers, alone survive.

Looking back through history, Western science, born in ancient Greece and, advanced during the Industrial Revolution in eighteenth century England, could be seen as a series of realized dreams for people, improving lives through various technological innovations. Its ability to help people survive put it at the core of Western Civilization, and although it has caused different kinds of environmental problems, it nourishes people's longing to believe in the dynamic power of progress.

However, it can be argued that technological progress has already in reality reached a critical point, because it has created devastating atomic bombs, nuclear plants, and serious environmental problems. Science itself has no moral standard for judging the good and evil of

each research project, however, it tends to further progress. Also, in relation to global capitalism, advanced technology has supported globalization, helping generate a worldwide trend toward realizing secular human desire in order to profit enormously from them.

In order to prevent catastrophe in our future, it is necessary to reconsider the relationship between humans, nature and technological progress. In analyzing Atwood's novel, this presentation begins to do so, focusing especially on the theme of bioengineering.

2. HOW BIOENGINEERING IS USED IN THE FUTURE

If the twentieth century was the century of physics, the twenty-first century will be the century of biology.[4] Accordingly, in the futuristic society depicted in *Oryx and Crake*, highly advanced bioengineering techniques are used in various ways. First, transgenic animals are created so that their organs can be transplanted into humans. Second, genetically modified animals and plants are produced to increase production of meat and grains. Third, infectious viruses or bioforms are incubated and new medicines are made to cure the resulting diseases. Finally, a humanoid species is bioengineered. A detailed discussion of each of these techniques follows.

(1) Creating Transgenic Animals for Organ Transplantation

A global enterprise, called OrganInc Farm, creates pigoons by splicing the genes of pigs with those of raccoon. Because pigs resemble humans in terms of size, physiology, anatomy and pathology, researchers are interested in them as models for larger experiments. Instead of making clones, doctors grow human organs in the bodies of pigoons. (*Oryx and Crake*, 22)

In addition, an enormous corporation, NooSkins, grows small pigoons in an effort to develop a new method for renewing human skin. They use neogenetic method to cause pigoons to grow new skin to replace their old skin and make their skin cells young and fresh again.(*Oryx and Crake*, 55) Humans can take advantage of this fresh skin to renew their skin.

(2) Transgenic Experiments for Creating Hybrid Animals

Through transgenic experiments, different kinds of hybrid animals are being created. Successful examples include rakunks and spoat/giders. Clean and gentle rakunks made from skunks and raccoons become popular as pets. Spoat/giders created by combining genetics of goats and spiders can produce elastic and silky yarn.

Examples of failures include bobkittens, new cats meant to protect birds; snats, a combination of snakes and rats; big green rabbits; and wolvogs, created by merging wolves and dogs. These hybrids defy researchers' intentions; they cannot be controlled and become wild.

(3) Genetically Modifying Animals and Plants to Increase Food Production

ChickieNobs, created to generate more chicken meat in the form of additional breasts or drumsticks, are large bublike objects "that seemed to be covered with stippled whitish yellow skin. Out of them came twenty thick fleshy tubes, and at the end of each tube another bulb was growing." (*Oryx and Crake*, 202) They have no heads, just mouth-like openings at the top, where nutrients can be dumped in. They have no eyes or beaks or any other feature, because they do not need these. Chicken breasts can be obtained from the most efficient chicken farming operation after just two weeks. However, when Jimmy looks at a ChickieNob, he feels that "(t)he thing was a nightmare," (*Oryx and Crake*, 202) a comment Atwood uses to

emphasize the weirdness of this experiment.

In the field of agriculture, genetically modified grains are already commonly used. In 2013, Monsanto, a multinational biotechnology corporation based in the United States, took legal action against a Canadian farmer for violating their patent on genetically modified seeds, and Atwood's novel implicitly criticizes the way the Monsanto police and watchdogs of other such major corporations, keep people under surveillance.

(4) New Viruses and Medicines : A Conspiracy among Pharmaceutical Companies

HelthWyzer, a pharmaceutical company, has been producing vitamin supplements that contain harmful viruses, a practice they began a few years before the novel begins. They sell these to inhabitants of Pleebland, where plebeians, or common people, live. As a result, infectious diseases spread among them, and also the company simultaneously sells antidotes for the illness, profiting hugely. Progress in medical science has made almost all diseases conquerable in the future, promoting pharmaceutical companies keep themselves viable and profitable through ploys like this one.

Crake's father, who works for HelthWyzer, comes to know the company's secret, and is clandestinely killed by their guards as a result. Crake's bioterrorism and creation of humanoids seems to be his revenge on the company for his father's murder, though, at the same time, his behavior reveals the desire of scientists' to pursue ambitious quests in their own research filed.

(5) Creating a New Humanoid Species through Bioengineering

At the end of the novel, Crake creates new humanoid species, Crakers. At the same time, bioterrorism efforts succeed in swiping out almost all humans. Besides the Crakers, only Jimmy, some of the God's Gardeners (followers of an ecological religion), evil convicts called Painballers survive Crake's devastating Waterless Flood.

In order to understand this world Crake generates, it is helpful to know what characterizes his humanoids. Crakers have the following features:

1) They are beautiful and perfect in appearance, and docile and peaceful in character,
2) They have UV-resistant skin, built-in insect repellant, and immunity from microbes,
3) They eat nothing but leaves, grass, roots, and a berry or two. They can recycle their own excrement,
4) They have none of destructive characteristics responsible for the world's problems, such as racism or hierarchical tendencies,
5) They have no sense of religion and symbolism, which have been behind many human wars,
6) They have the names of famous historical figures such as George Washington and Mary Curie, which can make it seem that they are clones of these great people,
7) They die when they reach thirty years of age, which means they never experience old age.

3. ARGUMENTS AGAINST BIOENGINEERING

Through the words of characters and depictions of scientists, Atwood's novel levels important arguments against bioengineering. Jimmy makes certain comments against the morality of the scientists' working in bioengineering.

When he sees the headless ChickieNobs that grow many breasts in order to produce more

human food, he thinks, “this thing was going too far,” and that it has become “a nightmare.” (*Oryx and Crake*, 202) In addition, Atwood writes that “Jimmy had a cold feeling, a feeling that reminded him of the time his mother had left home: the same sense of the forbidden, of a door swinging open that ought to be kept locked, of a stream of secret lives, running underground, in the darkness just beneath his feet.” (*Oryx and Crake*, 216) Although Jimmy is not a devoted follower of Christianity, he has been raised in a Christian culture, and has adopted a more or less religious way of thinking. By expressing through Jimmy the position that the creation of life remains in the God’s domain, Atwood shows the disputability of bioengineering innovations.

In the meantime, scientists engaged in creating new animal species find great pleasure in their work, saying that “create-an-animal was so much fun” and that “it made you feel like God.” (*Oryx and Crake*, 51) Nonetheless, the fact that the scientists themselves share Jimmy’s “cold feeling” and resist fully engaging in the new world they have helped create. It is the people of Pleebland who consume the inexpensive, genetically modified food.

As this novel does not engage in further discussions about bioengineering, we would here like to introduce other opinions by scholars’ currently working in academia: a political scientist, Francis Fukuyama, and an insect scientist, Edward Wilson. In *Our Posthuman Future*[5], Fukuyama argues as follows that biotechnology progresses without being checked:

> We may be about to enter into a posthuman future, in which technology will give us the capacity gradually to alter that essence over time. Many embrace this power, under the banner of human freedom. They want to maximize the freedom of parents to choose the kind of children they have, the freedom of scientists to pursue research, and the freedom of entrepreneurs to make use of technology to create wealth. (Fukuyama, 217)

Here, Fukuyama refers to people’s reluctance to discuss the problems technologies cause. Even in the world of the novel biotechnology continues to develop without any discussion of its potential danger ever taking place.

4. QUESTIONS ABOUT CRAKERS

Crake creates his Crakers as ideal humanoids that accord with his own viewpoints, but some questions remain about their identities and survivability:

1) As Crakers have only virtuous characters, will they be able to survive in nature?
2) In a natural world, if a species loses its genetic diversity, the risk of extinction from certain diseases results. Are they safe from such diseases?
3) All of them are similarly beautiful and well-proportioned. They have names of great people, making them seem, at least when called by name, like clones of these historical figures. What are their own characteristics as an individual?
4) They should be educated by somebody. Who will take care of them and how?

The above unanswered questions give readers cause to worry about the Crakers’ survival.

Crake bases his vision for the new humanoids on simple, superficial ideals, such as physical beauty, youthfulness, and goodness, as well as the ability to adapt to a deteriorating environment. As Bouson[6] points out, the Crakers seem like something of a joke. Science has supreme authority, and its ability to fulfil simple secular desires has been socially

acknowledged in the world Atwood depicts.

If certain individuals were to check the scientific despotism, these people would seemingly qualify as humanists. However, 'Word People,' who represent humanists in this novel, cooperate with the scientists, using their knowledge to promote sales by big companies. In the trilogy, the group that does attempt to check the despotism is 'God's Gardeners' – the followers of a green religion founded by Adam One, and their eco-friendly activities are described in *The Year of the Flood*. This makes clear the confrontation between science and religion.

5. OPINIONS OF A HUMANIST AND A SCIENTIST

Regarding the development of bioengineering, what arguments do actual humanists and scientists working outside the novel's fictional world make? Here, we will again cite Francis Fukuyama and the biologist Edward Wilson, who is referred to as a saint in *The Year of the Flood*.

Fukuyama develops arguments against human transgenesis in *Our Posthuman Future: Consequences of the Biotechnology Revolution* (2003). He bases his reasons for opposition on (1) religion, (2) utilitarianism, and (3) philosophy. According to Christianity, God created humans in his likeness; therefore, splicing human genes is a profane deed. Although many people living in the present have lost their faith, they maintain similar religious feelings regarding altering human beings. In terms of utilitarianism, if individuals tailor their descendants to suit their own individual wishes, the result would be undesirable for society as a whole.

Lastly, Fukuyama argues that our society maintains based on the principle that human nature is universal and does not change. He discusses, "(F)or while human behavior is plastic and variable, it is not infinitely so; at a certain point deeply rooted natural instincts and patterns of behavior reassert themselves to undermine the social engineer's best-laid plans. (Fukuyama, 14)

Thus far, human nature has remained more or less the same, and human history is an accumulation of ideas on human rights that have been advocated, and various political systems that have been invented. However, it will be difficult to establish such systems in the future when distinguishing between gene-rich and gene-poor people becomes possible. This will result in the loss of the basis of human societies such as traditional parents-children relationships and other social dynamics.

Meanwhile, biologist Edward Wilson makes the following assert in *Consilience: The Unity of Knowledge*[7]:

> Each species is a masterpiece of evolution, offering a vast source of useful scientific knowledge because it is so thoroughly adapted to the environment in which it lives. Species alive today are thousands to millions of years old. Their genes, having been tested by adversity over so many generations, engineer a staggeringly complex array of biochemical devices to aid the survival and reproduction of the organisms carrying them. (*Consilience*, 322)

> To the extent that we banish the rest of life, we will impoverish our own species for all time. And if we should surrender our genetic nature to machine-aided ratiocination, and our ethics and art and our very meaning to a habit of careless discursion in the name of

> progress, imagining ourselves godlike and absolved from our ancient heritage, we will become nothing. (*Consilience*, 326)

Here, Wilson concludes that ethics in research and economic activities are essential and that they benefit humans. That a scientist and a humanist reach the same judgment concerning the future might not be coincident.

French critic, Paul Valery[8], points out that science, Hellenism, and Christianity are the three pillars supporting Western Civilization, and that this, among others scientific developments, used to be unique to Western countries. The main Western scientific method involves dividing the subject in question into smaller parts, clarifying each phenomenon by taking an analytic approach. During periods of a rapid progress, capitalism used the technology that it had created to generate profitable tools, modernizing our lives and making them more convenient. However, serious environmental problems are arguably causing this development to reach its limit. Atwood describes the image of science and technology, using a symbolic metaphor:

> Our technological system is the mill that grinds out anything you wish to order up, but no one knows how to turn it off. The end result of a totally efficient technological exploitation of Nature would be a lifeless desert: all natural capital would be exhausted, having been devoured by the mills of production, and the resulting debt to nature would be infinite. But long before, then, payback time will come for Mankind. (*Payback*, 201-2)[9]

The solution is to escape the cycle of producing, consuming, and then profiting from selling convenient products, but how is this possible?

In *Oryx and Crake*, female ecological activists advocating movements against huge global enterprises leave vivid impressions on readers. They recall Western mythology's symbolic depiction of Justice, Nature, and Fate as female. They also relate to present day activism. Recently, in Canada Naomi Klein has been criticizing economic activities of global corporations, and Maud Barlow gave a controversial presentation criticizing worldwide water business's exploitation of developing countries. In Atwood's work, an ecological activist named, Vandana Shiva, referred to as a saint in *MaddAddam*, used to study at Western Ontario University in Canada. She blames the prevalence of genetically modified seeds on global enterprises. These female activists influence the novel's characterization, and it can be said that Atwood tries to find hope through the activities of these women.

The late Japanese nuclear chemist, Jinzaburo Takagi, argues in his last book[10] that modern technology is highly aggressive in its interventions in the natural world. He concludes that more passive and peaceful methods should be used to maintain safety and harmony between nature and humans.

In the last scene of *MaddAddam*, the heroine, Toby becomes the leader of the survivors' group and these survivors live together, helping each other in harmony, perhaps reflecting what Takagi discusses in his book. For the first time following the extinction of humans, symbiosis and cooperation with other animals becomes possible in Atwood's novel, and this plot gives us a significant warning to our future.

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